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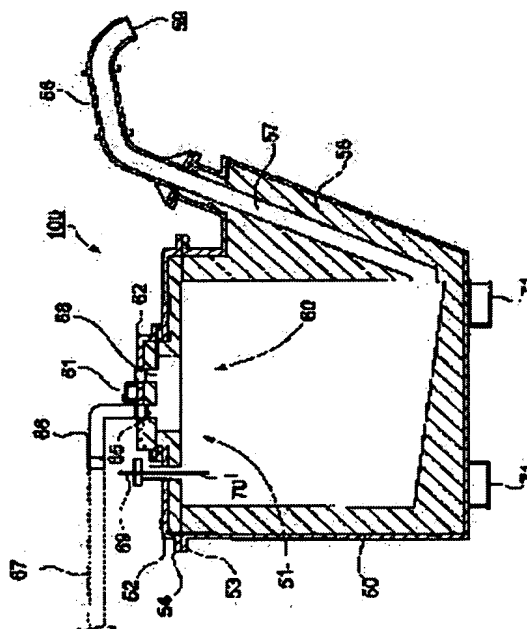
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## (54) CONTAINER FOR FEEDING MOLTEN METAL

(57)Abstract:

PROBLEM TO BE SOLVED: To prevent the clogging of a piping and a hole used for adjusting the inner pressure.

SOLUTION: The container is used for feeding the molten metal such as molten aluminum, wherein a through-hole 65 for adjusting the inner pressure is provided on a hatch 62, and a piping 66 for adjusting the inner pressure is connected to the through-hole 65, thereby enabling the sticking of a metal to the through-hole 65 for adjusting the inner pressure to be confirmed every time feeding the molten metal into the container 100. Therefor, the clogging of the piping 66 and the through-hole 65 used for adjusting the inner pressure can be previously prevented.



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## CLAIMS

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[Claim(s)]

[Claim 1]A container for molten-metal supply characterized by comprising the following.  
A container which can accommodate molten metal.

A channel which inside and outside of said container are opened for free passage and can be circulated in said molten metal.

A hatch in which it was provided in an upper face part of said container so that opening and closing were possible, and a breakthrough for internal pressure adjustment which opens inside and outside of said container for free passage was provided.

[Claim 2]A container for molten-metal supply with which said hatch is characterized by a thing of an upper face part of said container mostly established in the center in the container for molten-metal supply according to claim 1.

[Claim 3]A container for molten-metal supply providing further piping which was attached to said breakthrough, projected towards the upper part from an upper face part of said container, was horizontally bent in a position of predetermined height in the container for molten-metal supply according to claim 1 or 2, and was drawn horizontally.

[Claim 4]A container for molten-metal supply, wherein said piping is screwed on said breakthrough removable in the container for molten-metal supply according to claim 3.

[Claim 5]A container for molten-metal supply characterized by comprising the following.  
A container which can accommodate molten metal, opens inside and outside for free passage, and has a breakthrough for internal pressure adjustment of an upper face part mostly provided in a main position.

A channel which inside and outside of said container are opened for free passage and can be circulated in said molten metal.

[Claim 6]A container for molten-metal supply, wherein said container possesses further a hatch of an upper face part of the container concerned mostly provided in the central part and said breakthrough is provided in said hatch in the container for molten-metal supply

according to claim 5.

[Claim 7]A container for molten-metal supply providing further piping which could attach to said breakthrough, projected towards the upper part from an upper face part of said container, was horizontally bent in a position of predetermined height in the container for molten-metal supply according to claim 5 or 6, and was drawn horizontally.

[Claim 8]A container for molten-metal supply, wherein said piping is screwed on said container removable in the container for molten-metal supply according to claim 7.

[Claim 9]A container for molten-metal supply characterized by comprising the following.  
A container which can accommodate molten metal and has the 1st opening in the upper part.

A channel which inside and outside of said container are opened for free passage and can be circulated in said molten metal.

A lid which is arranged fixed so that the 1st opening of said container may be covered, and has the 2nd opening of a byway rather than said 1st opening in the center mostly.

A hatch in which it was provided in an upper face part of said lid so that opening and closing were possible, and a breakthrough for internal pressure adjustment which opens inside and outside of said container for free passage was provided.

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[Translation done.]

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the container for molten-metal supply used for conveyance of the aluminum fused, for example.

[0002]

[Description of the Prior Art]At the factory where molding of aluminum is performed using many dies casting machines, supply of an aluminum material is received from the outside not only of the inside of a factory but a factory in many cases. In this case, supplying material with the state where conveyed the ladle which accommodated aluminum in the state where it fused to the factory by the side of molding, and it was fused from the factory by the side of material supplying to each dies casting machine is performed.

[0003]It is structure like a teapot so to speak for which piping for supply was attached to the side attachment wall of the package body in which molten metal is stored, and, as for the ladle used from the former, supplying molten metal to the holding furnace by the side of molding from piping is performed by leaning this ladle.

[0004]

[Problem(s) to be Solved by the Invention]However, in such a ladle, the inclination of the ladle is performed using the fork lift truck, for example, and such work was not necessarily able to be said as a safe thing. Since it was necessary to provide a moving mechanism in a fork lift truck in order to make a ladle incline, composition became special and the technical problem that the worker who became skillful in operation of a fork lift truck for still such operation was needed occurred.

[0005]Therefore, this invention persons have advocated the distribution system of the molten metal using a pressure differential. This system provides piping for deriving molten metal outside at the sealed container, connects piping for supplying an application-of-pressure gas to this container further, and is drawing molten metal from piping for metal derivation to the holding furnace by the side of molding of the exterior by pressurizing the inside of a container.

[0006]However, in the container of the above-mentioned composition, there is a problem of getting blocked easily piping for application-of-pressure gas supplies. In particular, in the above-mentioned system, since a container is carried in a track and carried from a factory via a public road at other factories, it shakes, and there are many things, and, for this reason, the oil level of the molten metal in a container inclines, or a drop scatters within a container, and these adhere to piping for application-of-pressure gas supplies, for example. And in such adhesion, piping \*\*\*\* has occurred, for example in the repeated thing.

[0007]In view of the above situation, the main purpose of this invention is to provide the container for molten-metal supply which can prevent piping for using for internal pressure adjustment, and \*\*\*\* of a hole.

[0008]

[Means for Solving the Problem]In order to solve this technical problem, a molten-metal distribution system concerning a main viewpoint of this invention, Inside and outside of a container which can accommodate molten metal, and said container are opened for free passage, and it is provided in a channel which can be circulated in said molten metal, and an upper face part of said container so that opening and closing are possible, and a hatch in which a breakthrough for internal pressure adjustment which opens inside and outside of said container for free passage was provided is provided.

[0009]Usually, it precedes supplying molten metal in this container, and a container is preheated with warmers, such as a gas burner. This preheating is performed by opening a hatch and inserting some warmers into a container. Therefore, whenever a hatch supplies molten metal in a container, it can be opened. In this invention, since a breakthrough for internal pressure adjustment is provided in such a hatch, adhesion of metal to a breakthrough for [ whenever it supplies molten metal in a container ] internal pressure adjustment can be checked. And what is necessary is just to remove it each time, when metal has adhered, for example to a breakthrough. Therefore, in this invention, piping for using for internal pressure adjustment and \*\*\*\* of a hole can be prevented beforehand. This hatch is provided with sealing members, such as packing for securing airtightness for an inside of a container, in this invention. As for packing, what has heat resistance, such as a thing made from silicon, is preferred.

[0010]As for a container for molten-metal supply of this invention, said hatch is characterized by a thing of an upper face part of said container mostly established in the center.

[0011]When a container shakes, and an oil level inclines or a drop scatters, a degree to which change and a drop of an oil level scatter more in a direction near a center section is smaller than near the periphery in a container. In this invention, a breakthrough for internal pressure adjustment is provided in a hatch, and adhering to piping and a hole of an upper face part of a container corresponding to a position with a small degree to which change and a drop of an oil level moreover scatter as mentioned above in the hatch for metal to use for internal pressure adjustment since it is mostly provided in the center decreases.

Therefore, in this invention, piping for using for internal pressure adjustment and \*\*\*\* of a hole can be prevented.

[0012]A container for molten-metal supply of this invention is attached to said breakthrough, it projects towards the upper part from an upper face part of said container, and it is horizontally bent in a position of predetermined height, and piping drawn horizontally is provided further.

[0013]In a system for which a container concerning this invention is used, piping from a tank for application-of-pressure gas supplies or a pump for decompression is connected to piping attached to a breakthrough, for example. Such connection is made, whenever it introduces molten metal in a container, or whenever it derives molten metal from the inside of a container. On the other hand, a container with which molten metal is stored is very an elevated temperature, and workability is in a bad state. In a container concerning this invention, a breakthrough for internal pressure adjustment is the composition on the upper surface of a container which exists in the center mostly, and if piping extended up as it is was attached, the workability of connection during the above piping is dramatically bad. On the other hand, a worker can work safely and easily by extending a hand to a connection point during piping by having composition which piping derives horizontally as mentioned above, for example.

[0014]A container for molten-metal supply of this invention is screwed on removable [ to said breakthrough ] in said piping.

[0015]It becomes possible with constituting from this invention so that piping may be screwed on removable to a breakthrough to detach and attach piping from a breakthrough depending on how like a spanner to use so to speak in the piping itself currently drawn horizontally. Therefore, attachment and detachment of piping can be performed easily, without using a special tool etc. This becomes possible to often check plugging condition of piping, for example, and \*\*\*\* of piping for using for internal pressure adjustment can be prevented beforehand.

[0016]This invention is characterized by a container for molten-metal supply concerning another viewpoint comprising the following.

A container which can accommodate molten metal, opens inside and outside for free passage, and has a breakthrough for internal pressure adjustment of an upper face part mostly provided in a main position.

A channel which inside and outside of said container are opened for free passage and can be circulated in said molten metal.

[0017]As mentioned above, when a container shakes, and an oil level inclines or a drop scatters, a degree to which change and a drop of an oil level scatter more in a direction near a center section is smaller than near the periphery in a container. In this invention, adhering to piping of an upper face part of a container corresponding to a position with a small degree to which change and a drop of an oil level scatter in this way in a

breakthrough for internal pressure adjustment for metal to use for internal pressure adjustment since it is mostly provided in the center, or a hole decreases. Therefore, in this invention, piping for using for internal pressure adjustment and \*\*\*\* of a hole can be prevented.

[0018]As for a container for molten-metal supply of this invention, said container possesses further a hatch of an upper face part of the container concerned mostly provided in the central part, and said breakthrough is provided in said hatch.

[0019]As mentioned above, it usually precedes supplying molten metal in a container, and a container is preheated with a gas burner. This preheating is performed by opening a hatch and inserting a gas burner into a container. Therefore, whenever a hatch supplies molten metal in a container, it can be opened. In this invention, since a breakthrough for internal pressure adjustment is provided in such a hatch, adhesion of metal to a breakthrough for [ whenever it supplies molten metal in a container ] internal pressure adjustment can be checked. And what is necessary is just to remove it each time, when metal has adhered, for example to a breakthrough. Therefore, in this invention, piping for using for internal pressure adjustment and \*\*\*\* of a hole can be prevented beforehand.

[0020]A container for molten-metal supply of this invention can be attached to said breakthrough, it projects towards the upper part from an upper face part of said container, and it is horizontally bent in a position of predetermined height, and piping drawn horizontally is provided further.

[0021]A container for molten-metal supply concerning another viewpoint of this invention, A container which can accommodate molten metal and has the 1st opening in the upper part, A channel which inside and outside of said container are opened for free passage and can be circulated in said molten metal, A hatch in which it has been arranged fixed so that the 1st opening of said container may be covered, and was provided in an upper face part of a lid which has the 2nd opening of a byway rather than said 1st opening in the center mostly, and said lid so that opening and closing were possible, and a breakthrough for internal pressure adjustment which opens inside and outside of said container for free passage was provided is provided.

[0022]In this invention, since a breakthrough for internal pressure adjustment is provided in such a hatch, adhesion of metal to a breakthrough for [ whenever it supplies molten metal in a container ] internal pressure adjustment can be checked. Therefore, in this invention, piping for using for internal pressure adjustment and \*\*\*\* of a hole can be prevented beforehand. In this invention, a breakthrough for internal pressure adjustment is provided in a hatch, and adhering to piping and a hole of an upper face part of a container corresponding to a position with a small degree to which change and a drop of an oil level moreover scatter as mentioned above in the hatch for metal to use for internal pressure adjustment since it is mostly provided in the center decreases. Therefore, in this invention, piping for using for internal pressure adjustment and \*\*\*\* of a hole can be prevented. In this invention, since a hatch is provided in an upper face part of a lid, distance of a rear face of

a hatch and an oil level becomes long by thickness of a lid compared with distance of a rear face of a lid, and an oil level. Therefore, a possibility that metal will adhere to a rear face of a hatch in which a breakthrough was provided becomes low. Therefore, in this invention, piping for using for internal pressure adjustment and \*\*\*\* of a hole can be prevented.

[0023]You may make it provide a package body and piping allocated out of a package body from position [ center / of said package body ] shifted as the above-mentioned container.

[0024]To getting it blocked, shortly after piping has been soaked in a molten metal within a container, in this invention. Since piping has shifted from the center of a package body, if it returns horizontally after displacement to an oil level in a container becomes large and breathes out a molten metal in this state, when it leans, space will be made between a piping lower end and a melt surface, and pipe clogging will be prevented.

[0025]A container of this invention possesses at least one passage which connects the 1st frame that constitutes the 1st space, the 2nd frame allocated so that the 2nd space might be constituted between said 1st frame, and said 1st space and said 2nd space.

[0026]If the 2nd space is lengthened to a vacuum, it will be kept warm, and a fall of insulation efficiency by aging of thermal insulation can be compensated with this invention. If the 1st space is pressurized from the 2nd space side via a passage, after a feeding gas is preheated, it will be supplied to an inside of a container. Therefore, a temperature fall of a molten metal can be suppressed small. In particular, in a feeding culmination, it is easy to generate intermittent regurgitation of a molten metal and a gas, temperature of a molten metal is taken by feeding gas in that case, and viscosity becomes large. Therefore, by preheating a feeding gas, a temperature fall of a molten metal can be controlled and pipe clogging can be prevented effectively. In addition, safe stopping hot water supply can also be performed and time which stopping hot water supply takes can be shortened.

[0027]In this invention, leak of the 1st space can be performed from the 2nd space side via a passage. Although a gas of the 1st space pressurized at the time of a feeding stop is leaked and \*\* pressure is carried out to ordinary pressure, then, since a gas of the 1st space coexists with a molten metal, it is very an elevated temperature, and if this high temperature gas was leaked directly, its leak valve will be hurt. On the other hand, by performing leak of the 1st space from the 2nd space side via a passage, thermal load concerning a leak valve can be reduced and improvement in reliability of a device and reinforcement can be attained.

[0028]A container of this invention is provided with the following.

The 1st frame that constitutes the 1st space.

The 2nd frame allocated so that the 2nd space might be constituted between said 1st frame.

At least one passage which connects said 1st space and said 2nd space.

The 1st valve connected in said package body, and the 2nd valve of \*\* inserted on said passage.



[0029]In this invention, improvement in the reliability of time reduction which stopping-hot-water-supply operation takes, or stop operation can be aimed at. That is, the 2nd space is decompressed, at the time of stopping hot water supply, opens wide the 2nd valve of an occasion that opens the 1st valve wide first and carries out \*\* pressure of the inside of the 1st space, and makes the 1st space negative pressure. Thereby, pull back by the side of perfect stopping hot water supply and also a container of a molten metal in piping can be performed.

[0030]A container of this invention is provided with the following.

Package body.

Piping which has an inclination which is connected near a package body pars basilaris ossis occipitalis, and goes up at least.

[0031]A container of this invention is provided with the following.

Package body.

A septum carried out for 2 minutes opening inside of a package body for free passage near the lower part.

A gutter which said septum was divided for while and was connected to the space side.

[0032]A container of this invention is provided with the following.

Package body.

A septum carried out for 2 minutes opening inside of a package body for free passage near the lower part.

A gutter which said septum was separated for while and was connected to the space side.

A lid formed on said gutter.

[0033]namely, the time of \*\* maintenance with which \*\* maintenance will be \*\* got blocked very much easily if piping is in an inside of a main part -- with a piping crack -- it is said that it is cheap -- it is problematic.

[0034]In this invention, use space instead of piping, for example, it is made to overflow from an opening, and while it dissociated by a septum carries out hot water supply by a gutter. Even if a maintenance becomes very easy by this, it is moreover hard to get it blocked and it gets it blocked further, it can be made to usually recover by maintenance.

[0035]

[Embodiment of the Invention]Hereafter, an embodiment of the invention is described based on a drawing.

[0036]Drawing 1 is a figure showing the entire configuration of the metal distribution system concerning one embodiment of this invention.

[0037]As shown in the figure, the 1st factory 10 and 2nd factory 20 are established in the place distant via the public road 30.

[0038]Two or more dies casting machines 11 as the point of use are arranged at the 1st

factory 10. Each dies casting machine 11 molds the product of desired shape with injection molding, using the fused aluminum as raw material. The parts relevant to the engine of a car, etc. can be mentioned as the product. Of course, it does not matter even if it is the alloy which made the subject other metal, such as not only an aluminum alloy but magnesium, titanium, etc., as fused metal. Near each dies casting machine 11, the holding furnace (hand holding furnace) 12 which once stores the fused aluminum in front of a shot is arranged. Molten aluminum for two or more shots is stored by this holding furnace 12, and molten aluminum is poured into the dies casting machine 11 from the holding furnace 12 via Radl 13 or piping for every single shot. The temperature sensor (not shown) for detecting the temperature of the level detection sensor (not shown) which detects the oil level of the molten aluminum stored in the container, or molten aluminum is arranged in each holding furnace 12. The detection result by these sensors is transmitted to the operator control panel of each dies casting machine 11, or the central controlling part 16 of the 1st factory 10.

[0039]The acceptance stand 17 for receiving in the acceptance portion of the 1st factory 10 the container 100 mentioned later is arranged. The container 100 received on the acceptance stand 17 of the acceptance portion is delivered even to the predetermined dies casting machine 11 with the delivery van 18, and molten aluminum is supplied to the holding furnace 12 from the container 100. The container 100 which supply ended is again returned to the acceptance stand 17 of an acceptance portion with the delivery van 18.

[0040]The 1st furnace 19 for fusing aluminum and supplying the container 100 is formed in the 1st factory 10, and the container 100 to which molten aluminum was supplied at this 1st furnace 19 is also delivered even to the predetermined dies casting machine 11 with the delivery van 18.

[0041]When the addition of molten aluminum is needed for the 1st factory 10 in each dies casting machine 11, the indicator 15 which displays it is arranged. More specifically a peculiar number is shaken every dies casting machine 11, for example, the number is displayed on the indicator 15, and the number in the indicator 15 corresponding to the number of the dies casting machine 11 for which the addition of molten aluminum is needed lights up. Based on the display of this indicator 15, the dies casting machine 11 corresponding to that number carries the container 100 using the delivery van 18, and a worker supplies molten aluminum. Based on the detection result by a level detection sensor, the display in the indicator 15 is performed, when the central controlling part 16 controls.

[0042]The 2nd furnace 21 for fusing aluminum and supplying the container 100 is formed in the 2nd factory 20. Two or more sorts from which the container 100 differs in capacity, piping length, height, width, etc. are prepared. For example, according to the capacity of the holding furnace 12 in the dies casting machine 11 in the 1st factory 10, etc., there are two or more sorts from which capacity differs. However, of course, it does not matter even if the container 100 is unified into one kind and it standardizes it.

[0043]The container 100 with which molten aluminum was supplied by this 2nd furnace 21 is put on the track 32 for conveyance by the fork lift truck (not shown). The track 32 carries the container 100 through the public road 30 to near the acceptance stand 17 of the acceptance portion in the 1st factory 10, and these containers 100 are received by a fork lift truck (not shown), and are received in the stand 17. The container 100 of the empty in an acceptance portion is returned to the 2nd factory 20 by the track 32.

[0044]When the addition of molten aluminum is needed for the 2nd factory 20 in each dies casting machine 11 in the 1st factory 10, the indicator 22 which displays it is arranged. The composition of the indicator 22 is the same as that of the indicator 15 arranged in the 1st factory 10 almost. The display in the indicator 22 is performed when the central controlling part 16 in the 1st factory 10 controls, for example via the communication line 33. In the indicator 22 in the 2nd factory 20, Among the dies casting machines 11 which need supply of molten aluminum, from the 1st furnace 19 in the 1st factory 10, the dies casting machine 11 determined that molten aluminum is supplied is distinguished in the other dies casting machine 11, and is displayed. For example, the number corresponding to the dies casting machine 11 determined such blinks. What supplies molten aluminum from the 2nd factory 20 side accidentally to the dies casting machine 11 determined by this that molten aluminum is supplied from the 1st furnace 19 can be abolished. The data transmitted from the central controlling part 16 besides the above is also displayed on this indicator 22.

[0045]Next, operation of the metal distribution system constituted in this way is explained.

[0046]In the central controlling part 16, the quantity of molten aluminum in each holding furnace 12 is supervised via the level detection sensor formed in each holding furnace 12. When the necessity for supply of molten aluminum arises with a certain holding furnace 12 here, the central controlling part 16, "The peculiar number" of the holding furnace 12, the "temperature data" of the holding furnace 12 detected by the temperature sensor formed in the holding furnace 12, The "gestalt data" about the gestalt (it mentions later.) of the holding furnace 12, final "time information" whose molten aluminum is lost from the holding furnace 12, The "traffic data" of the public road 30, the "quantity data" of the molten aluminum demanded with the holding furnace 12, "atmospheric temperature data", etc. are transmitted to the 2nd factory 20 side via the communication line 33. These data is expressed to the indicator 22 as the 2nd factory 20. Just before molten aluminum disappears from the above-mentioned holding furnace 12 experientially based on these displayed data in a worker, the container 100 reaches the holding furnace 12, And the dispatch time of the container 100 from this 2nd factory 20 and the temperature at the time of dispatch of molten aluminum are determined that molten aluminum at that time will serve as a desired temperature. Or just before it downloads these data to a personal computer (not shown) and molten aluminum disappears from the above-mentioned holding furnace 12 using predetermined software, the container 100 reaches the holding furnace 12, And molten aluminum at that time presumes that the dispatch time of the container 100 from this 2nd factory 20 and the temperature at the time of dispatch of molten aluminum become a

desired temperature, and it may be made to display the time and temperature. Or temperature control of the 2nd furnace 21 may be automatically carried out with the presumed temperature. Based on the above "quantity data", it may determine also about the quantity of the molten aluminum which should be accommodated in the container 100. [0047]If the track 32 which carried the container 100 at dispatch time leaves and it arrives at the 1st factory 10 through the public road 30, the container 100 will be received in the acceptance stand 17 of an acceptance portion from the track 32.

[0048]Then, the received container 100 is delivered even to the predetermined dies casting machine 11 with the delivery van 18 with the acceptance stand 17, and molten aluminum is supplied to the holding furnace 12 from the container 100.

[0049]As shown in drawing 2, in this example, the molten aluminum accommodated in the container 100 by sending out in the container 100 which had high pressure air sealed from the receiver tank 101 is breathed out from the piping 56, and is supplied in the holding furnace 12. In drawing 2, 103 is a pressurizing valve and 104 is a leak valve.

[0050]Here, the height of the holding furnace 12 has various kinds of things, and regulation of it is attained so that the tip of the piping 56 may serve as an optimal position on the holding furnace 12 according to the rising and falling mechanism provided in the delivery van 18. However, depending on the height of the holding furnace 12, it may be unable to correspond only by a rising and falling mechanism. Then, in this system, as "gestalt data" about the gestalt of the holding furnace 12, The data about the height of the holding furnace 12 or the distance to the holding furnace 12, etc. are beforehand sent to the 2nd factory 20 side, and the container 100 of the optimal gestalt, for example, the optimal height, is chosen and delivered based on this data in the 2nd factory 20 side. The container 100 of the optimal size may be chosen and delivered according to the quantity which should be supplied.

[0051]Next, the suitable container (pressure type molten-metal supply container) 100 for the system constituted in this way is explained based on drawing 3 and drawing 4. Drawing 3 is a sectional view of the container 100, and drawing 4 is the top view.

[0052]As for the container 100, the large lid 52 is arranged at the owner bottom at the upper opening 51 of the tubed main part 50. The flanges 53 and 54 are formed in the periphery of the main part 50 and the large lid 51, respectively, and the main part 50 and the large lid 51 are being fixed by fastening between these flanges with the bolt 55. As for the main part 50 or the large lid 51, the outside is metal and the inside is constituted by fire refractory material material and thermal insulation.

[0053]The piping fitting part 58 in which the channel 57 which is open for free passage for the piping 56 from main part 50 inside was established is formed in one place of the periphery of the main part 50, and the piping 56 is being fixed to it so that it may be open for free passage to the channel 57 of this piping fitting part 58. The piping 56 has gamma-like shape and, thereby, the end mouth 59 of the piping 56 has turned to the lower part. More specifically, about 10 degrees of end mouths 59 of the piping 56 lean as opposed to

the altitude. Thus, when the molten metal drawn from the end mouth 59 by giving an inclination flowed and falls to the server side, it decreases that a hot water drop scatters from the surface of hot water.

[0054]The hatch 62 of the above-mentioned large lid 52 for which the opening 60 was mostly formed in the center and the handle 61 was attached to the opening 60 is arranged. The hatch 62 is formed in the position somewhat higher than the large lid 52 upper surface. It is attached to one place of the periphery of the hatch 62 via the hinge 63 at the large lid 52. Thereby, opening and closing of the hatch 62 are enabled to the opening 60 of the large lid 52. The bolt 64 with the handle for fixing the hatch 62 to the large lid 52 is attached to two places of the periphery of the hatch 62 so that it may counter with the position to which this hinge 63 was attached. The hatch 62 will be fixed to the large lid 52 by shutting the opening 60 of the large lid 52 on the hatch 62, and rotating the bolt 64 with a handle. Counterrotation of the bolt 64 with a handle can be carried out, conclusion can be opened wide, and the hatch 62 can be opened from the opening 60 of the large lid 52. And where the hatch 62 is opened, maintenance of container 100 inside and insertion of the gas burner at the time of preheating are performed via the opening 60.

[0055]The breakthrough 65 for the internal pressure adjustment for performing the decompression and application of pressure in the container 100 is formed in the position [ center / the center of the hatch 62, or ] shifted for a while. The piping 66 for pressurization and decompression is connected to this breakthrough 65. This piping 66 was extended from the breakthrough 65 to the upper part, and it turned at it in predetermined height, and it has extended horizontally from there. The screw thread is cut in the surface of the insert portion to the breakthrough 65 of this piping 66, on the other hand, the screw thread is cut by the breakthrough 65, and, thereby, the piping 66 is fixed by a screw stop to the breakthrough 65.

[0056]Connection of the piping 67 for application of pressure or for decompression is attained at one side of this piping 66, the tank accumulated in the application-of-pressure gas and the pump for application of pressure are connected to piping for application of pressure, and the pump for decompression is connected to piping for decompression. And it is possible to introduce molten aluminum in the container 100 via the piping 56 and the channel 57 using a pressure differential with decompression, and derivation of molten aluminum to the outside of the container 100 is possible via the channel 57 and the piping 56 using a pressure differential by application of pressure. Oxidation of molten aluminum at the time of application of pressure can be more effectively prevented by using inert gas, for example, nitrogen gas, as an application-of-pressure gas.

[0057]According to this embodiment, since the above-mentioned piping 66 has extended horizontally while the breakthrough 65 for pressurization and decompression is formed in the hatch 62 of the large lid 52 mostly arranged in the center section, the work which connects the piping 67 for application of pressure or for decompression to the above-mentioned piping 66 can be done safely and easily. Since the piping 66 can be rotated by

small power to the breakthrough 65 when the piping 66 extends in this way, it is very small power about the immobilization of the piping 66 and removal by which the screw stop was carried out to the breakthrough 65, and it can carry out, without using a tool, for example.

[0058]The breakthrough 68 for pressure release is formed in the position which counters in the breakthrough 65 for the aforementioned pressurization and decompression in the position [ center / of the hatch 62 ] shifted for a while, and a relief valve (a graphic display is omitted) is attached to the breakthrough 68 for pressure release. When the inside of the container 100 becomes more than a predetermined pressure thereby, for example, the inside of the container 100 is wide opened by atmospheric pressure from a viewpoint of safety.

[0059]The two breakthroughs 70 for surface sensors in which the two electrodes 69 as a surface sensor are inserted, respectively are arranged with the predetermined interval at the large lid 52. The electrode 69 is inserted in these breakthroughs 70, respectively. These electrodes 69 are arranged so that it may counter within the container 100, and each tip has extended to the almost same position as the maximum oil level of the molten metal for example, in the container 100. And it can be possible to detect the maximum oil level of the molten metal in the container 100 by monitoring the switch-on between the electrodes 69, and, thereby, the oversupply of the molten metal to the container 100 can be more certainly prevented now.

[0060]the leg (channel) 71 of length predetermined in the section mouth shape where the fork (a graphic display is omitted) of a fork lift truck is inserted in the pars-basilaris-occipitalis rear face of the main part 50, for example -- for example, two are arranged so that it may be parallel. As for the pars basilaris ossis occipitalis of the main part 50 inside, the whole inclines so that the channel 57 side may become low. Thereby, when deriving molten aluminum outside via the channel 57 and the piping 56 by application of pressure, the so-called remainder of hot water decreases. When leaning the container 100, for example at the time of a maintenance and deriving molten aluminum outside via the channel 57 and the piping 56, the angle which leans the container 100 can be made smaller and it becomes the thing excellent in safety or workability.

[0061]Thus, in the container 100 concerning this embodiment, since the breakthrough 65 for internal pressure adjustment was formed in the hatch 62 and the piping 66 for internal pressure adjustment is connected to the breakthrough 65, the adhesion of metal to the breakthrough 65 for [ whenever it supplies molten metal in the container 100 ] internal pressure adjustment can be checked. Therefore, the piping 66 for using for internal pressure adjustment and \*\*\*\* of the breakthrough 65 can be prevented beforehand.

[0062]In the container 100 concerning this embodiment, the breakthrough 65 for internal pressure adjustment is formed in the hatch 62, And adhering to the piping 66 of the upper face part of the container 100 corresponding to a position with a degree small in comparison to which change and the drop of the oil level of molten aluminum scatter in the hatch 62 for molten aluminum to use for internal pressure adjustment since it is mostly

provided in the center, or the breakthrough 65 decreases. Therefore, the piping 66 for using for internal pressure adjustment and \*\*\*\* of the breakthrough 65 can be prevented.

[0063]In the container 100 concerning this embodiment, since the hatch 62 is formed in the upper face part of the large lid 52, the distance of the rear face of the hatch 62 and an oil level becomes long by the thickness of the large lid 52 compared with the distance of the rear face of the large lid 52, and an oil level. Therefore, a possibility that aluminum will adhere to the rear face of the hatch 62 in which the breakthrough 65 was formed becomes low, and the piping 66 for using for internal pressure adjustment and \*\*\*\* of the breakthrough 65 can be prevented.

[0064]Next, the distribution system from the 2nd furnace 21 in the 2nd factory 20 to the container 100 is explained based on drawing 5.

[0065]As shown in drawing 5, molten aluminum is stored in the 2nd furnace 21. The feed zone 21a is formed in this 2nd furnace 21, and the siphon 201 is inserted in this feed zone 21a. This siphon 201 is arranged so that an end mouth (tip part 201b of another side of the siphon 201) may appear frequently from the oil level of the aluminum to which melting of the feed zone 21a was carried out. That is, one tip part 201a of the siphon 201 extends to near the pars basilaris ossis occipitalis of the 2nd furnace 21, and the tip part 201b of another side of the siphon 201 is drawn from the feed zone 21a outside. The siphon 201 inclines fundamentally according to the maintaining structure 202, and is held. About 10 degrees leans to the altitude and the angle of inclination agrees with the inclination of the tip part of the piping 56 in the above-mentioned container 100. It is connected to the tip part of the piping 56 in the container 100, and it becomes easy by agreeing an inclination in this way to connect the tip part 201b of this siphon 201 with the tip part 201b of the siphon 201 and the tip part of the piping 56 in the container 100.

[0066]And the piping 67 connected to the pump 313 for decompression is connected to the piping 66. Next, the pump 313 is operated and the inside of the container 100 is decompressed. Thereby, the molten aluminum currently stored in the 2nd furnace 21 is introduced in the container 100 via the siphon 201 and the piping 56.

[0067]According to this embodiment, since he is trying to introduce the molten aluminum currently especially stored in the 2nd furnace 21 in this way in the container 100 via the siphon 201 and the piping 56, molten aluminum does not contact external air. Therefore, an oxide does not arise and the molten aluminum supplied using this system becomes what has dramatically good quality. The work for removing an oxide from the inside of the container 100 becomes unnecessary, and workability's improves.

[0068]Especially according to this embodiment, since the introduction of molten aluminum and the derivation of molten aluminum from the container 100 to the container 100 can be substantially performed only using the piping 56 and 312 of two, a system configuration can be made very simple. Since the opportunity for molten aluminum to contact the open air decreases sharply, generation of an oxide can be lost mostly.

[0069]Drawing 6 shows the manufacturing flow at the time of applying the above system to

an auto factory.

[0070]First, as shown in drawing 5, the molten aluminum currently stored in the 2nd furnace 21 is introduced in the container 100 via the siphon 201 and the piping 56 (Step 501). (\*\*\*\*)

[0071]Next, as shown in drawing 1, the container 100 is conveyed from the 2nd factory 20 to the 1st factory 10 with the track 32 via the public road 30 (Step 502).

[0072]Next, at the 1st factory (point of use) 10, the container 100 is delivered even to the dies casting machine 11 for automobile engine manufacture with the delivery van 18, and molten aluminum is supplied to the holding furnace 12 from the container 100 (Step 503).

[0073]Next, in this dies casting machine 11, molding of the automobile engine using the molten aluminum stored by the holding furnace 12 is performed (Step 504).

[0074]And an assembly of a car is performed using the automobile engine and other parts which were molded in this way, and a car is completed (Step 505).

[0075]In this embodiment, since the engine of a car is a product made from aluminum which hardly contains an oxide as mentioned above, it is possible to manufacture the car which has an engine with sufficient performance and endurance.

[0076]Another embodiment of this invention is described.

[0077]Drawing 7 is a sectional view of the container concerning a 2nd embodiment of this invention. The state where it was made to incline is shown by the figure.

[0078]The container 2100 shown in the figure is provided with the following.

Package body 2110.

Piping 2130 allocated out of the package body 2110 from the position [ center / 2111 / of the package body 2110 ] 2112 shifted.

[0079]The package body 2110 has the opening 2113 in the upper part, and it is equipped with the lid 2114 so that the opening 2113 may be plugged up.

[0080]The package body 2110 is provided with the following.

The 1st frame 2116 that constitutes the 1st space 2115, for example, consists of steel, such as SS400 (JIS).

The 2nd frame 2118 that consists of steel, such as SS400 (JIS), for example, it was allocated so that the 2nd space 117 might be constituted between the 1st frame 2116.

As for these frame materials, it is preferred to constitute from material with a small coefficient of linear expansion, and it is preferred that the difference of a coefficient of linear expansion with insulators, such as an axle-pin rake who constructs to a inner layer, adopts a small material. That the 1st frame and 2nd frame make the physical properties cooperate furthermore has chosen and adopted the material which has the same physical properties preferably here.

[0081]The locking members 2119 and 2119 of the shape of a character of one pair of mouths in which the fork of a fork lift truck is inserted are attached to the pars basilaris ossis occipitalis of the package body 2110.

[0082]The opening 2121 for [ the ] pouring the molten metal 2120 of metal, such as



aluminum, into main slippage into the package body 2110 mostly is formed in the lid 2114, The child lid 2122 is fixed to the opening 2121 by the fastener which the child lid 2122 was pivoted by the opening 2121, and omitted the graphic display.

[0083]The feed port 2123 for introducing the gas for application of pressure into the 1st space 2115 in the package body 2110 from the booster pump which omitted the graphic display is established in the lid 2114. Oxidation of the molten metal 2120 can be prevented by using inactive gas, such as nitrogen gas, as the above-mentioned gas.

[0084]The piping 2130 allocated out of the package body 2110 from the position [ center / 2111 / of the package body 2110 ] 2112 shifted is attached to the lid 2114. The lower end 2131 of the piping 2130 is located to near the pars basilaris ossis occipitalis in the package body 2110. The mechanism whose opening and closing of this lower end 2131 are enabled may be formed. Thereby, when a container falls, it becomes possible to prevent hot water from flowing out. The piping 2130 is provided with the following.

The inclined part 2132 which inclines 5 degrees - about 10 degrees towards the upper part out of the package body 2110.

The discharge part 2133 which is turned caudad and carries out an opening.

[0085]Here, in the case of a container [ 80 cm in inside diameter ], the interval of the center 2111 of the package body 2110 and the above-mentioned gap position 2112 is about 30 cm, for example. Even if this displacement is larger and it is small, it can acquire the same effect.

[0086]In such a container 2100, first, according to a horizontal state, an application-of-pressure gas is introduced from the feed port 2123, and the molten metal 2120 in the package body 2110 is fed outside from the piping 2130. Then, it is made to incline in the piping 2130 side by a fork lift truck, as shown in drawing 7, and the remaining molten metals 2120 are fed outside from the piping 2130.

[0087]In the container 2100 of this embodiment constituted in this way. Since the piping 2130 has shifted from the center of the package body 2110, if it returns horizontally after the displacement to the oil level in the package body 2110 becomes large and breathes out a molten metal in this state, when it leans, space will be made between the lower end 2131 of the piping 2130, and the 2120th page of a molten metal, and pipe clogging will be prevented.

[0088]Drawing 8 is a sectional view of the container concerning a 3rd embodiment of this invention. The same numerals are given to the same component as the component already illustrated by following embodiments, and explanation is omitted.

[0089]In this container 2200, at least one passage (piping) 2210 which connects the 1st space 2115 and 2nd space 2117 is formed.

[0090]The pressurizing mechanism 2220 and the leak valve 2230 are attached to the 2nd space 2117.

[0091]In the pressurizing mechanism 2220, application-of-pressure air is introduced into the

2nd space 2117 from the air tank 2223 via 2222 in the pressurizing valve 2221 and a reducing valve. moreover -- the pressurizing mechanism 2220 -- pressure KONTORA 2224 -- attachment \*\*\*\*\*.

[0092]It is also possible to replace with the pressurizing mechanism 2220 and to connect a vacuum pump.

[0093]If the 2nd space 2117 is lengthened to the vacuum, it will be kept warm, and the fall of the insulation efficiency by aging of thermal insulation can be compensated with the container 2200 constituted in this way. For example, what is necessary is just to raise a degree of vacuum according to aging.

[0094]In the container 2200 constituted in this way, if the 1st space 2115 is pressurized from the between [ the 2nd empty 2116 ] side via the passage 2210, after a feeding gas is preheated, it will be supplied to the inside of a container (the 1st space 2115). Therefore, the temperature fall of a molten metal can be suppressed small. In particular, in a feeding culmination, it is easy to generate the intermittent regurgitation of a molten metal and a gas, the temperature of a molten metal is taken by the feeding gas in that case, and viscosity becomes large. Therefore, by preheating a feeding gas, the temperature fall of a molten metal can be controlled and pipe clogging can be prevented effectively. In addition, safe stopping hot water supply can also be performed and time which stopping hot water supply takes can be shortened.

[0095]In the container 2200 constituted in this way, by it being made to perform leak of the 1st space 2115 by the leak valve 2230 from the 2nd space 2117 side via the passage 2210, after cooling high temperature gas to some extent, it is leaking from the leak valve 2230. Therefore, the thermal load concerning the leak valve 2230 can be reduced, and improvement in reliability of a device and reinforcement can be attained.

[0096]Drawing 9 is a sectional view of the container concerning a 4th embodiment of this invention.

[0097]In the container 2300 shown in the figure, the pressurizing mechanism 2220 is connected to the 1st space 2115, and the reduced pressure control 2310 is connected to the 2nd space 2117. In the reduced pressure control 2310, the vacuum pump 2312 is connected to the 2nd space 2117, for example via the vacuum valve 2311, and the vacuum meter 2313 and the leak valve 2314 are inserted among them.

[0098]The leak valve 2320 as the 2nd valve is inserted in the passage 2210 which connects the 1st space 2115 and 2nd space 2117, and also the leak valve 2321 as the 1st valve is connected into the package body.

[0099]In the container 2300 of such composition, improvement in the reliability of the time reduction which stopping-hot-water-supply operation takes, or stop operation can be aimed at. That is, the 2nd space 2117 is decompressed, at the time of stopping hot water supply, opens wide the leak valve 2320 as the 2nd valve of the occasion that opens the leak valve 2321 as the 1st valve wide first, and carries out \*\* pressure of the inside of the 1st space 2115, and makes the 1st space 2115 negative pressure. Thereby, pull back by the side of

perfect stopping hot water supply and also the container of the molten metal in piping can be performed.

[0100]Drawing 10 is a sectional view of the container concerning a 5th embodiment of this invention.

[0101]In the container 2400 shown in the figure, the piping 2420 which has an inclination which goes up is connected near the package body 2410 pars basilaris ossis occipitalis. The other end of the piping 2420 is prolonged to the position higher than the container 2400 at least.

[0102]Drawing 11 is a sectional view of the container concerning a 6th embodiment of this invention.

[0103]In the container 2500 shown in the figure, the septum 2520 carried out for 2 minutes opening the inside of the package body 2510 for free passage near the lower part and the gutter 2540 which while was divided and was connected to the space 2530 side by the septum 2520 are provided. The pressurizing mechanism 2220 is connected to the space 2531 of another side. The lid 2541 is formed in the upper part of the bucket part 2540.

[0104]In the container 2500 of this embodiment, if the inside of a container is pressurized according to the pressurizing mechanism 2220, the hot water in a container will be breathed out outside via the gutter 2540.

[0105]namely, the time of \*\* maintenance with which \*\* maintenance will be \*\* got blocked very much easily if piping is in the inside of a main part -- with a piping crack -- it is said that it is cheap -- it is problematic.

[0106]On the other hand, in the container 2500 of this embodiment, use the space 2530 instead of piping, for example, it is made to overflow from the opening 2532, and while it dissociated by the septum 2520 carries out hot water supply by the gutter 2540. Even if a maintenance becomes very easy by this, it is moreover hard to get it blocked and it gets it blocked further, it can be made to usually recover by maintenance.

[0107]Drawing 12 is a sectional view of the container concerning a 7th embodiment of this invention.

[0108]The container 2600 shown in the figure removes the lid 2541 arranged in the upper part of the bucket part 2540 in the container shown in drawing 11.

[0109]

[Effect of the Invention]As explained above, according to this invention, piping for using for internal pressure adjustment and \*\*\*\* of a hole can be prevented.

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[Translation done.]

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TECHNICAL FIELD

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[Field of the Invention]This invention relates to the container for molten-metal supply used for conveyance of the aluminum fused, for example.

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[Translation done.]

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PRIOR ART

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[Description of the Prior Art]At the factory where molding of aluminum is performed using many dies casting machines, supply of an aluminum material is received from the outside not only of the inside of a factory but a factory in many cases. In this case, supplying material with the state where conveyed the ladle which accommodated aluminum in the state where it fused to the factory by the side of molding, and it was fused from the factory by the side of material supplying to each dies casting machine is performed.

[0003]It is structure like a teapot so to speak for which piping for supply was attached to the side attachment wall of the package body in which molten metal is stored, and, as for the ladle used from the former, supplying molten metal to the holding furnace by the side of molding from piping is performed by leaning this ladle.

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EFFECT OF THE INVENTION

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[Effect of the Invention]As explained above, according to this invention, piping for using for internal pressure adjustment and \*\*\*\* of a hole can be prevented.

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention]However, in such a ladle, the inclination of the ladle is performed using the fork lift truck, for example, and such work was not necessarily able to be said as a safe thing. Since it was necessary to provide a moving mechanism in a fork lift truck in order to make a ladle incline, composition became special and the technical problem that the worker who became skillful in operation of a fork lift truck for still such operation was needed occurred.

[0005]Therefore, this invention persons have advocated the distribution system of the molten metal using a pressure differential. This system provides piping for deriving molten metal outside at the sealed container, connects piping for supplying an application-of-pressure gas to this container further, and is drawing molten metal from piping for metal derivation to the holding furnace by the side of molding of the exterior by pressurizing the inside of a container.

[0006]However, in the container of the above-mentioned composition, there is a problem of getting blocked easily piping for application-of-pressure gas supplies. In particular, in the above-mentioned system, since a container is carried in a track and carried from a factory via a public road at other factories, it shakes, and there are many things, and, for this reason, the oil level of the molten metal in a container inclines, or a drop scatters within a container, and these adhere to piping for application-of-pressure gas supplies, for example. And in such adhesion, piping \*\*\*\* has occurred, for example in the repeated thing.

[0007]In view of the above situation, the main purpose of this invention is to provide the container for molten-metal supply which can prevent piping for using for internal pressure adjustment, and \*\*\*\* of a hole.

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[Translation done.]

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**MEANS**

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[Means for Solving the Problem]In order to solve this technical problem, a molten-metal distribution system concerning a main viewpoint of this invention, Inside and outside of a container which can accommodate molten metal, and said container are opened for free passage, and it is provided in a channel which can be circulated in said molten metal, and an upper face part of said container so that opening and closing are possible, and a hatch in which a breakthrough for internal pressure adjustment which opens inside and outside of said container for free passage was provided is provided.

[0009]Usually, it precedes supplying molten metal in this container, and a container is preheated with warmers, such as a gas burner. This preheating is performed by opening a hatch and inserting some warmers into a container. Therefore, whenever a hatch supplies molten metal in a container, it can be opened. In this invention, since a breakthrough for internal pressure adjustment is provided in such a hatch, adhesion of metal to a breakthrough for [ whenever it supplies molten metal in a container ] internal pressure adjustment can be checked. And what is necessary is just to remove it each time, when metal has adhered, for example to a breakthrough. Therefore, in this invention, piping for using for internal pressure adjustment and \*\*\*\* of a hole can be prevented beforehand. This hatch is provided with sealing members, such as packing for securing airtightness for an inside of a container, in this invention. As for packing, what has heat resistance, such as a thing made from silicon, is preferred.

[0010]As for a container for molten-metal supply of this invention, said hatch is characterized by a thing of an upper face part of said container mostly established in the center.

[0011]When a container shakes, and an oil level inclines or a drop scatters, a degree to which change and a drop of an oil level scatter more in a direction near a center section is smaller than near the periphery in a container. In this invention, a breakthrough for internal pressure adjustment is provided in a hatch, and adhering to piping and a hole of an upper face part of a container corresponding to a position with a small degree to which change and a drop of an oil level moreover scatter as mentioned above in the hatch for metal to



use for internal pressure adjustment since it is mostly provided in the center decreases. Therefore, in this invention, piping for using for internal pressure adjustment and \*\*\*\* of a hole can be prevented.

[0012]A container for molten-metal supply of this invention is attached to said breakthrough, it projects towards the upper part from an upper face part of said container, and it is horizontally bent in a position of predetermined height, and piping drawn horizontally is provided further.

[0013]In a system for which a container concerning this invention is used, piping from a tank for application-of-pressure gas supplies or a pump for decompression is connected to piping attached to a breakthrough, for example. Such connection is made, whenever it introduces molten metal in a container, or whenever it derives molten metal from the inside of a container. On the other hand, a container with which molten metal is stored is very an elevated temperature, and workability is in a bad state. In a container concerning this invention, a breakthrough for internal pressure adjustment is the composition on the upper surface of a container which exists in the center mostly, and if piping extended up as it is was attached, the workability of connection during the above piping is dramatically bad. On the other hand, a worker can work safely and easily by extending a hand to a connection point during piping by having composition which piping derives horizontally as mentioned above, for example.

[0014]A container for molten-metal supply of this invention is screwed on removable [ to said breakthrough ] in said piping.

[0015]It becomes possible with constituting from this invention so that piping may be screwed on removable to a breakthrough to detach and attach piping from a breakthrough depending on how like a spanner to use so to speak in the piping itself currently drawn horizontally. Therefore, attachment and detachment of piping can be performed easily, without using a special tool etc. This becomes possible to often check plugging condition of piping, for example, and \*\*\*\* of piping for using for internal pressure adjustment can be prevented beforehand.

[0016]This invention is characterized by a container for molten-metal supply concerning another viewpoint comprising the following.

A container which can accommodate molten metal, opens inside and outside for free passage, and has a breakthrough for internal pressure adjustment of an upper face part mostly provided in a main position.

A channel which inside and outside of said container are opened for free passage and can be circulated in said molten metal.

[0017]As mentioned above, when a container shakes, and an oil level inclines or a drop scatters, a degree to which change and a drop of an oil level scatter more in a direction near a center section is smaller than near the periphery in a container. In this invention, adhering to piping of an upper face part of a container corresponding to a position with a

small degree to which change and a drop of an oil level scatter in this way in a breakthrough for internal pressure adjustment for metal to use for internal pressure adjustment since it is mostly provided in the center, or a hole decreases. Therefore, in this invention, piping for using for internal pressure adjustment and \*\*\*\* of a hole can be prevented.

[0018]As for a container for molten-metal supply of this invention, said container possesses further a hatch of an upper face part of the container concerned mostly provided in the central part, and said breakthrough is provided in said hatch.

[0019]As mentioned above, it usually precedes supplying molten metal in a container, and a container is preheated with a gas burner. This preheating is performed by opening a hatch and inserting a gas burner into a container. Therefore, whenever a hatch supplies molten metal in a container, it can be opened. In this invention, since a breakthrough for internal pressure adjustment is provided in such a hatch, adhesion of metal to a breakthrough for [ whenever it supplies molten metal in a container ] internal pressure adjustment can be checked. And what is necessary is just to remove it each time, when metal has adhered, for example to a breakthrough. Therefore, in this invention, piping for using for internal pressure adjustment and \*\*\*\* of a hole can be prevented beforehand.

[0020]A container for molten-metal supply of this invention can be attached to said breakthrough, it projects towards the upper part from an upper face part of said container, and it is horizontally bent in a position of predetermined height, and piping drawn horizontally is provided further.

[0021]A container for molten-metal supply concerning another viewpoint of this invention, A container which can accommodate molten metal and has the 1st opening in the upper part, A channel which inside and outside of said container are opened for free passage and can be circulated in said molten metal, A hatch in which it has been arranged fixed so that the 1st opening of said container may be covered, and was provided in an upper face part of a lid which has the 2nd opening of a byway rather than said 1st opening in the center mostly, and said lid so that opening and closing were possible, and a breakthrough for internal pressure adjustment which opens inside and outside of said container for free passage was provided is provided.

[0022]In this invention, since a breakthrough for internal pressure adjustment is provided in such a hatch, adhesion of metal to a breakthrough for [ whenever it supplies molten metal in a container ] internal pressure adjustment can be checked. Therefore, in this invention, piping for using for internal pressure adjustment and \*\*\*\* of a hole can be prevented beforehand. In this invention, a breakthrough for internal pressure adjustment is provided in a hatch, and adhering to piping and a hole of an upper face part of a container corresponding to a position with a small degree to which change and a drop of an oil level moreover scatter as mentioned above in the hatch for metal to use for internal pressure adjustment since it is mostly provided in the center decreases. Therefore, in this invention, piping for using for internal pressure adjustment and \*\*\*\* of a hole can be prevented. In this

invention, since a hatch is provided in an upper face part of a lid, distance of a rear face of a hatch and an oil level becomes long by thickness of a lid compared with distance of a rear face of a lid, and an oil level. Therefore, a possibility that metal will adhere to a rear face of a hatch in which a breakthrough was provided becomes low. Therefore, in this invention, piping for using for internal pressure adjustment and \*\*\*\* of a hole can be prevented.

[0023]You may make it provide a package body and piping allocated out of a package body from position [ center / of said package body ] shifted as the above-mentioned container.

[0024]To getting it blocked, shortly after piping has been soaked in a molten metal within a container, in this invention. Since piping has shifted from the center of a package body, if it returns horizontally after displacement to an oil level in a container becomes large and breathes out a molten metal in this state, when it leans, space will be made between a piping lower end and a melt surface, and pipe clogging will be prevented.

[0025]A container of this invention possesses at least one passage which connects the 1st frame that constitutes the 1st space, the 2nd frame allocated so that the 2nd space might be constituted between said 1st frame, and said 1st space and said 2nd space.

[0026]If the 2nd space is lengthened to a vacuum, it will be kept warm, and a fall of insulation efficiency by aging of thermal insulation can be compensated with this invention. If the 1st space is pressurized from the 2nd space side via a passage, after a feeding gas is preheated, it will be supplied to an inside of a container. Therefore, a temperature fall of a molten metal can be suppressed small. In particular, in a feeding culmination, it is easy to generate intermittent regurgitation of a molten metal and a gas, temperature of a molten metal is taken by feeding gas in that case, and viscosity becomes large. Therefore, by preheating a feeding gas, a temperature fall of a molten metal can be controlled and pipe clogging can be prevented effectively. In addition, safe stopping hot water supply can also be performed and time which stopping hot water supply takes can be shortened.

[0027]In this invention, leak of the 1st space can be performed from the 2nd space side via a passage. Although a gas of the 1st space pressurized at the time of a feeding stop is leaked and \*\* pressure is carried out to ordinary pressure, then, since a gas of the 1st space coexists with a molten metal, it is very an elevated temperature, and if this high temperature gas was leaked directly, its leak valve will be hurt. On the other hand, by performing leak of the 1st space from the 2nd space side via a passage, thermal load concerning a leak valve can be reduced and improvement in reliability of a device and reinforcement can be attained.

[0028]A container of this invention is provided with the following.

The 1st frame that constitutes the 1st space.

The 2nd frame allocated so that the 2nd space might be constituted between said 1st frame.

At least one passage which connects said 1st space and said 2nd space.

The 1st valve connected in said package body, and the 2nd valve of \*\* inserted on said passage.

[0029]In this invention, improvement in the reliability of time reduction which stopping-hot-water-supply operation takes, or stop operation can be aimed at. That is, the 2nd space is decompressed, at the time of stopping hot water supply, opens wide the 2nd valve of an occasion that opens the 1st valve wide first and carries out \*\* pressure of the inside of the 1st space, and makes the 1st space negative pressure. Thereby, pull back by the side of perfect stopping hot water supply and also a container of a molten metal in piping can be performed.

[0030]A container of this invention is provided with the following.

Package body.

Piping which has an inclination which is connected near a package body pars basilaris ossis occipitalis, and goes up at least.

[0031]A container of this invention is provided with the following.

Package body.

A septum carried out for 2 minutes opening inside of a package body for free passage near the lower part.

A gutter which said septum was divided for while and was connected to the space side.

[0032]A container of this invention is provided with the following.

Package body.

A septum carried out for 2 minutes opening inside of a package body for free passage near the lower part.

A gutter which said septum was separated for while and was connected to the space side.

A lid formed on said gutter.

[0033]namely, the time of \*\* maintenance with which \*\* maintenance will be \*\* got blocked very much easily if piping is in an inside of a main part -- with a piping crack -- it is said that it is cheap -- it is problematic.

[0034]In this invention, use space instead of piping, for example, it is made to overflow from an opening, and while it dissociated by a septum carries out hot water supply by a gutter.

Even if a maintenance becomes very easy by this, it is moreover hard to get it blocked and it gets it blocked further, it can be made to usually recover by maintenance.

[0035]

[Embodiment of the Invention]Hereafter, an embodiment of the invention is described based on a drawing.

[0036]Drawing 1 is a figure showing the entire configuration of the metal distribution system concerning one embodiment of this invention.

[0037]As shown in the figure, the 1st factory 10 and 2nd factory 20 are established in the place distant via the public road 30.

[0038]Two or more dies casting machines 11 as the point of use are arranged at the 1st factory 10. Each dies casting machine 11 molds the product of desired shape with injection molding, using the fused aluminum as raw material. The parts relevant to the engine of a car, etc. can be mentioned as the product. Of course, it does not matter even if it is the alloy which made the subject other metal, such as not only an aluminum alloy but magnesium, titanium, etc., as fused metal. Near each dies casting machine 11, the holding furnace (hand holding furnace) 12 which once stores the fused aluminum in front of a shot is arranged. Molten aluminum for two or more shots is stored by this holding furnace 12, and molten aluminum is poured into the dies casting machine 11 from the holding furnace 12 via Radl 13 or piping for every single shot. The temperature sensor (not shown) for detecting the temperature of the level detection sensor (not shown) which detects the oil level of the molten aluminum stored in the container, or molten aluminum is arranged in each holding furnace 12. The detection result by these sensors is transmitted to the operator control panel of each dies casting machine 11, or the central controlling part 16 of the 1st factory 10.

[0039]The acceptance stand 17 for receiving in the acceptance portion of the 1st factory 10 the container 100 mentioned later is arranged. The container 100 received on the acceptance stand 17 of the acceptance portion is delivered even to the predetermined dies casting machine 11 with the delivery van 18, and molten aluminum is supplied to the holding furnace 12 from the container 100. The container 100 which supply ended is again returned to the acceptance stand 17 of an acceptance portion with the delivery van 18.

[0040]The 1st furnace 19 for fusing aluminum and supplying the container 100 is formed in the 1st factory 10, and the container 100 to which molten aluminum was supplied at this 1st furnace 19 is also delivered even to the predetermined dies casting machine 11 with the delivery van 18.

[0041]When the addition of molten aluminum is needed for the 1st factory 10 in each dies casting machine 11, the indicator 15 which displays it is arranged. More specifically a peculiar number is shaken every dies casting machine 11, for example, the number is displayed on the indicator 15, and the number in the indicator 15 corresponding to the number of the dies casting machine 11 for which the addition of molten aluminum is needed lights up. Based on the display of this indicator 15, the dies casting machine 11 corresponding to that number carries the container 100 using the delivery van 18, and a worker supplies molten aluminum. Based on the detection result by a level detection sensor, the display in the indicator 15 is performed, when the central controlling part 16 controls.

[0042]The 2nd furnace 21 for fusing aluminum and supplying the container 100 is formed in the 2nd factory 20. Two or more sorts from which the container 100 differs in capacity, piping length, height, width, etc. are prepared. For example, according to the capacity of the holding furnace 12 in the dies casting machine 11 in the 1st factory 10, etc., there are two or more sorts from which capacity differs. However, of course, it does not matter even if the

container 100 is unified into one kind and it standardizes it.

[0043]The container 100 with which molten aluminum was supplied by this 2nd furnace 21 is put on the track 32 for conveyance by the fork lift truck (not shown). The track 32 carries the container 100 through the public road 30 to near the acceptance stand 17 of the acceptance portion in the 1st factory 10, and these containers 100 are received by a fork lift truck (not shown), and are received in the stand 17. The container 100 of the empty in an acceptance portion is returned to the 2nd factory 20 by the track 32.

[0044]When the addition of molten aluminum is needed for the 2nd factory 20 in each dies casting machine 11 in the 1st factory 10, the indicator 22 which displays it is arranged. The composition of the indicator 22 is the same as that of the indicator 15 arranged in the 1st factory 10 almost. The display in the indicator 22 is performed when the central controlling part 16 in the 1st factory 10 controls, for example via the communication line 33. In the indicator 22 in the 2nd factory 20, Among the dies casting machines 11 which need supply of molten aluminum, from the 1st furnace 19 in the 1st factory 10, the dies casting machine 11 determined that molten aluminum is supplied is distinguished in the other dies casting machine 11, and is displayed. For example, the number corresponding to the dies casting machine 11 determined such blinks. What supplies molten aluminum from the 2nd factory 20 side accidentally to the dies casting machine 11 determined by this that molten aluminum is supplied from the 1st furnace 19 can be abolished. The data transmitted from the central controlling part 16 besides the above is also displayed on this indicator 22.

[0045]Next, operation of the metal distribution system constituted in this way is explained.

[0046]In the central controlling part 16, the quantity of molten aluminum in each holding furnace 12 is supervised via the level detection sensor formed in each holding furnace 12. When the necessity for supply of molten aluminum arises with a certain holding furnace 12 here, the central controlling part 16, "The peculiar number" of the holding furnace 12, the "temperature data" of the holding furnace 12 detected by the temperature sensor formed in the holding furnace 12, The "gestalt data" about the gestalt (it mentions later.) of the holding furnace 12, final "time information" whose molten aluminum is lost from the holding furnace 12, The "traffic data" of the public road 30, the "quantity data" of the molten aluminum demanded with the holding furnace 12, "atmospheric temperature data", etc. are transmitted to the 2nd factory 20 side via the communication line 33. These data is expressed to the indicator 22 as the 2nd factory 20. Just before molten aluminum disappears from the above-mentioned holding furnace 12 experientially based on these displayed data in a worker, the container 100 reaches the holding furnace 12, And the dispatch time of the container 100 from this 2nd factory 20 and the temperature at the time of dispatch of molten aluminum are determined that molten aluminum at that time will serve as a desired temperature. Or just before it downloads these data to a personal computer (not shown) and molten aluminum disappears from the above-mentioned holding furnace 12 using predetermined software, the container 100 reaches the holding furnace 12, And molten aluminum at that time presumes that the dispatch time of the container 100 from this

2nd factory 20 and the temperature at the time of dispatch of molten aluminum become a desired temperature, and it may be made to display the time and temperature. Or temperature control of the 2nd furnace 21 may be automatically carried out with the presumed temperature. Based on the above "quantity data", it may determine also about the quantity of the molten aluminum which should be accommodated in the container 100. [0047]If the track 32 which carried the container 100 at dispatch time leaves and it arrives at the 1st factory 10 through the public road 30, the container 100 will be received in the acceptance stand 17 of an acceptance portion from the track 32.

[0048]Then, the received container 100 is delivered even to the predetermined dies casting machine 11 with the delivery van 18 with the acceptance stand 17, and molten aluminum is supplied to the holding furnace 12 from the container 100.

[0049]As shown in drawing 2, in this example, the molten aluminum accommodated in the container 100 by sending out in the container 100 which had high pressure air sealed from the receiver tank 101 is breathed out from the piping 56, and is supplied in the holding furnace 12. In drawing 2, 103 is a pressurizing valve and 104 is a leak valve.

[0050]Here, the height of the holding furnace 12 has various kinds of things, and regulation of it is attained so that the tip of the piping 56 may serve as an optimal position on the holding furnace 12 according to the rising and falling mechanism provided in the delivery van 18. However, depending on the height of the holding furnace 12, it may be unable to correspond only by a rising and falling mechanism. Then, in this system, as "gestalt data" about the gestalt of the holding furnace 12, The data about the height of the holding furnace 12 or the distance to the holding furnace 12, etc. are beforehand sent to the 2nd factory 20 side, and the container 100 of the optimal gestalt, for example, the optimal height, is chosen and delivered based on this data in the 2nd factory 20 side. The container 100 of the optimal size may be chosen and delivered according to the quantity which should be supplied.

[0051]Next, the suitable container (pressure type molten-metal supply container) 100 for the system constituted in this way is explained based on drawing 3 and drawing 4. Drawing 3 is a sectional view of the container 100, and drawing 4 is the top view.

[0052]As for the container 100, the large lid 52 is arranged at the owner bottom at the upper opening 51 of the tubed main part 50. The flanges 53 and 54 are formed in the periphery of the main part 50 and the large lid 51, respectively, and the main part 50 and the large lid 51 are being fixed by fastening between these flanges with the bolt 55. As for the main part 50 or the large lid 51, the outside is metal and the inside is constituted by fire refractory material material and thermal insulation.

[0053]The piping fitting part 58 in which the channel 57 which is open for free passage for the piping 56 from main part 50 inside was established is formed in one place of the periphery of the main part 50, and the piping 56 is being fixed to it so that it may be open for free passage to the channel 57 of this piping fitting part 58. The piping 56 has gamma-like shape and, thereby, the end mouth 59 of the piping 56 has turned to the lower part.

More specifically, about 10 degrees of end mouths 59 of the piping 56 lean as opposed to the altitude. Thus, when the molten metal drawn from the end mouth 59 by giving an inclination flowed and falls to the server side, it decreases that a hot water drop scatters from the surface of hot water.

[0054]The hatch 62 of the above-mentioned large lid 52 for which the opening 60 was mostly formed in the center and the handle 61 was attached to the opening 60 is arranged. The hatch 62 is formed in the position somewhat higher than the large lid 52 upper surface. It is attached to one place of the periphery of the hatch 62 via the hinge 63 at the large lid 52. Thereby, opening and closing of the hatch 62 are enabled to the opening 60 of the large lid 52. The bolt 64 with the handle for fixing the hatch 62 to the large lid 52 is attached to two places of the periphery of the hatch 62 so that it may counter with the position to which this hinge 63 was attached. The hatch 62 will be fixed to the large lid 52 by shutting the opening 60 of the large lid 52 on the hatch 62, and rotating the bolt 64 with a handle. Counterrotation of the bolt 64 with a handle can be carried out, conclusion can be opened wide, and the hatch 62 can be opened from the opening 60 of the large lid 52. And where the hatch 62 is opened, maintenance of container 100 inside and insertion of the gas burner at the time of preheating are performed via the opening 60.

[0055]The breakthrough 65 for the internal pressure adjustment for performing the decompression and application of pressure in the container 100 is formed in the position [ center / the center of the hatch 62, or ] shifted for a while. The piping 66 for pressurization and decompression is connected to this breakthrough 65. This piping 66 was extended from the breakthrough 65 to the upper part, and it turned at it in predetermined height, and it has extended horizontally from there. The screw thread is cut in the surface of the insert portion to the breakthrough 65 of this piping 66, on the other hand, the screw thread is cut by the breakthrough 65, and, thereby, the piping 66 is fixed by a screw stop to the breakthrough 65.

[0056]Connection of the piping 67 for application of pressure or for decompression is attained at one side of this piping 66, the tank accumulated in the application-of-pressure gas and the pump for application of pressure are connected to piping for application of pressure, and the pump for decompression is connected to piping for decompression. And it is possible to introduce molten aluminum in the container 100 via the piping 56 and the channel 57 using a pressure differential with decompression, and derivation of molten aluminum to the outside of the container 100 is possible via the channel 57 and the piping 56 using a pressure differential by application of pressure. Oxidation of molten aluminum at the time of application of pressure can be more effectively prevented by using inert gas, for example, nitrogen gas, as an application-of-pressure gas.

[0057]According to this embodiment, since the above-mentioned piping 66 has extended horizontally while the breakthrough 65 for pressurization and decompression is formed in the hatch 62 of the large lid 52 mostly arranged in the center section, the work which connects the piping 67 for application of pressure or for decompression to the above-



mentioned piping 66 can be done safely and easily. Since the piping 66 can be rotated by small power to the breakthrough 65 when the piping 66 extends in this way, it is very small power about the immobilization of the piping 66 and removal by which the screw stop was carried out to the breakthrough 65, and it can carry out, without using a tool, for example. [0058]The breakthrough 68 for pressure release is formed in the position which counters in the breakthrough 65 for the aforementioned pressurization and decompression in the position [ center / of the hatch 62 ] shifted for a while, and a relief valve (a graphic display is omitted) is attached to the breakthrough 68 for pressure release. When the inside of the container 100 becomes more than a predetermined pressure thereby, for example, the inside of the container 100 is wide opened by atmospheric pressure from a viewpoint of safety.

[0059]The two breakthroughs 70 for surface sensors in which the two electrodes 69 as a surface sensor are inserted, respectively are arranged with the predetermined interval at the large lid 52. The electrode 69 is inserted in these breakthroughs 70, respectively. These electrodes 69 are arranged so that it may counter within the container 100, and each tip has extended to the almost same position as the maximum oil level of the molten metal for example, in the container 100. And it can be possible to detect the maximum oil level of the molten metal in the container 100 by monitoring the switch-on between the electrodes 69, and, thereby, the oversupply of the molten metal to the container 100 can be more certainly prevented now.

[0060]the leg (channel) 71 of length predetermined in the section mouth shape where the fork (a graphic display is omitted) of a fork lift truck is inserted in the pars-basilaris-occipitalis rear face of the main part 50, for example -- for example, two are arranged so that it may be parallel. As for the pars basilaris ossis occipitalis of the main part 50 inside, the whole inclines so that the channel 57 side may become low. Thereby, when deriving molten aluminum outside via the channel 57 and the piping 56 by application of pressure, the so-called remainder of hot water decreases. When leaning the container 100, for example at the time of a maintenance and deriving molten aluminum outside via the channel 57 and the piping 56, the angle which leans the container 100 can be made smaller and it becomes the thing excellent in safety or workability.

[0061]Thus, in the container 100 concerning this embodiment, since the breakthrough 65 for internal pressure adjustment was formed in the hatch 62 and the piping 66 for internal pressure adjustment is connected to the breakthrough 65, the adhesion of metal to the breakthrough 65 for [ whenever it supplies molten metal in the container 100 ] internal pressure adjustment can be checked. Therefore, the piping 66 for using for internal pressure adjustment and \*\*\*\* of the breakthrough 65 can be prevented beforehand.

[0062]In the container 100 concerning this embodiment, the breakthrough 65 for internal pressure adjustment is formed in the hatch 62, And adhering to the piping 66 of the upper face part of the container 100 corresponding to a position with a degree small in comparison to which change and the drop of the oil level of molten aluminum scatter in the

hatch 62 for molten aluminum to use for internal pressure adjustment since it is mostly provided in the center, or the breakthrough 65 decreases. Therefore, the piping 66 for using for internal pressure adjustment and \*\*\*\* of the breakthrough 65 can be prevented.

[0063]In the container 100 concerning this embodiment, since the hatch 62 is formed in the upper face part of the large lid 52, the distance of the rear face of the hatch 62 and an oil level becomes long by the thickness of the large lid 52 compared with the distance of the rear face of the large lid 52, and an oil level. Therefore, a possibility that aluminum will adhere to the rear face of the hatch 62 in which the breakthrough 65 was formed becomes low, and the piping 66 for using for internal pressure adjustment and \*\*\*\* of the breakthrough 65 can be prevented.

[0064]Next, the distribution system from the 2nd furnace 21 in the 2nd factory 20 to the container 100 is explained based on drawing 5.

[0065]As shown in drawing 5, molten aluminum is stored in the 2nd furnace 21. The feed zone 21a is formed in this 2nd furnace 21, and the siphon 201 is inserted in this feed zone 21a. This siphon 201 is arranged so that an end mouth (tip part 201b of another side of the siphon 201) may appear frequently from the oil level of the aluminum to which melting of the feed zone 21a was carried out. That is, one tip part 201a of the siphon 201 extends to near the pars basilaris ossis occipitalis of the 2nd furnace 21, and the tip part 201b of another side of the siphon 201 is drawn from the feed zone 21a outside. The siphon 201 inclines fundamentally according to the maintaining structure 202, and is held. About 10 degrees leans to the altitude and the angle of inclination agrees with the inclination of the tip part of the piping 56 in the above-mentioned container 100. It is connected to the tip part of the piping 56 in the container 100, and it becomes easy by agreeing an inclination in this way to connect the tip part 201b of this siphon 201 with the tip part 201b of the siphon 201 and the tip part of the piping 56 in the container 100.

[0066]And the piping 67 connected to the pump 313 for decompression is connected to the piping 66. Next, the pump 313 is operated and the inside of the container 100 is decompressed. Thereby, the molten aluminum currently stored in the 2nd furnace 21 is introduced in the container 100 via the siphon 201 and the piping 56.

[0067]According to this embodiment, since he is trying to introduce the molten aluminum currently especially stored in the 2nd furnace 21 in this way in the container 100 via the siphon 201 and the piping 56, molten aluminum does not contact external air. Therefore, an oxide does not arise and the molten aluminum supplied using this system becomes what has dramatically good quality. The work for removing an oxide from the inside of the container 100 becomes unnecessary, and workability's improves.

[0068]Especially according to this embodiment, since the introduction of molten aluminum and the derivation of molten aluminum from the container 100 to the container 100 can be substantially performed only using the piping 56 and 312 of two, a system configuration can be made very simple. Since the opportunity for molten aluminum to contact the open air decreases sharply, generation of an oxide can be lost mostly.

[0069]Drawing 6 shows the manufacturing flow at the time of applying the above system to an auto factory.

[0070]First, as shown in drawing 5, the molten aluminum currently stored in the 2nd furnace 21 is introduced in the container 100 via the siphon 201 and the piping 56 (Step 501). (\*\*\*\*)

[0071]Next, as shown in drawing 1, the container 100 is conveyed from the 2nd factory 20 to the 1st factory 10 with the track 32 via the public road 30 (Step 502).

[0072]Next, at the 1st factory (point of use) 10, the container 100 is delivered even to the dies casting machine 11 for automobile engine manufacture with the delivery van 18, and molten aluminum is supplied to the holding furnace 12 from the container 100 (Step 503).

[0073]Next, in this dies casting machine 11, molding of the automobile engine using the molten aluminum stored by the holding furnace 12 is performed (Step 504).

[0074]And an assembly of a car is performed using the automobile engine and other parts which were molded in this way, and a car is completed (Step 505).

[0075]In this embodiment, since the engine of a car is a product made from aluminum which hardly contains an oxide as mentioned above, it is possible to manufacture the car which has an engine with sufficient performance and endurance.

[0076]Another embodiment of this invention is described.

[0077]Drawing 7 is a sectional view of the container concerning a 2nd embodiment of this invention. The state where it was made to incline is shown by the figure.

[0078]The container 2100 shown in the figure is provided with the following.

Package body 2110.

Piping 2130 allocated out of the package body 2110 from the position [ center / 2111 / of the package body 2110 ] 2112 shifted.

[0079]The package body 2110 has the opening 2113 in the upper part, and it is equipped with the lid 2114 so that the opening 2113 may be plugged up.

[0080]The package body 2110 is provided with the following.

The 1st frame 2116 that constitutes the 1st space 2115, for example, consists of steel, such as SS400 (JIS).

The 2nd frame 2118 that consists of steel, such as SS400 (JIS), for example, it was allocated so that the 2nd space 117 might be constituted between the 1st frame 2116.

As for these frame materials, it is preferred to constitute from material with a small coefficient of linear expansion, and it is preferred that the difference of a coefficient of linear expansion with insulators, such as an axle-pin rake who constructs to a inner layer, adopts a small material. That the 1st frame and 2nd frame make the physical properties cooperate furthermore has chosen and adopted the material which has the same physical properties preferably here.

[0081]The locking members 2119 and 2119 of the shape of a character of one pair of mouths in which the fork of a fork lift truck is inserted are attached to the pars basilaris ossis occipitalis of the package body 2110.

[0082]The opening 2121 for [ the ] pouring the molten metal 2120 of metal, such as aluminum, into main slippage into the package body 2110 mostly is formed in the lid 2114, The child lid 2122 is fixed to the opening 2121 by the fastener which the child lid 2122 was pivoted by the opening 2121, and omitted the graphic display.

[0083]The feed port 2123 for introducing the gas for application of pressure into the 1st space 2115 in the package body 2110 from the booster pump which omitted the graphic display is established in the lid 2114. Oxidation of the molten metal 2120 can be prevented by using inactive gas, such as nitrogen gas, as the above-mentioned gas.

[0084]The piping 2130 allocated out of the package body 2110 from the position [ center / 2111 / of the package body 2110 ] 2112 shifted is attached to the lid 2114. The lower end 2131 of the piping 2130 is located to near the pars basilaris ossis occipitalis in the package body 2110. The mechanism whose opening and closing of this lower end 2131 are enabled may be formed. Thereby, when a container falls, it becomes possible to prevent hot water from flowing out. The piping 2130 is provided with the following.

The inclined part 2132 which inclines 5 degrees - about 10 degrees towards the upper part out of the package body 2110.

The discharge part 2133 which is turned caudad and carries out an opening.

[0085]Here, in the case of a container [ 80 cm in inside diameter ], the interval of the center 2111 of the package body 2110 and the above-mentioned gap position 2112 is about 30 cm, for example. Even if this displacement is larger and it is small, it can acquire the same effect.

[0086]In such a container 2100, first, according to a horizontal state, an application-of-pressure gas is introduced from the feed port 2123, and the molten metal 2120 in the package body 2110 is fed outside from the piping 2130. Then, it is made to incline in the piping 2130 side by a fork lift truck, as shown in drawing 7, and the remaining molten metals 2120 are fed outside from the piping 2130.

[0087]In the container 2100 of this embodiment constituted in this way. Since the piping 2130 has shifted from the center of the package body 2110, if it returns horizontally after the displacement to the oil level in the package body 2110 becomes large and breathes out a molten metal in this state, when it leans, space will be made between the lower end 2131 of the piping 2130, and the 2120th page of a molten metal, and pipe clogging will be prevented.

[0088]Drawing 8 is a sectional view of the container concerning a 3rd embodiment of this invention. The same numerals are given to the same component as the component already illustrated by following embodiments, and explanation is omitted.

[0089]In this container 2200, at least one passage (piping) 2210 which connects the 1st space 2115 and 2nd space 2117 is formed.

[0090]The pressurizing mechanism 2220 and the leak valve 2230 are attached to the 2nd space 2117.

[0091]In the pressurizing mechanism 2220, application-of-pressure air is introduced into the 2nd space 2117 from the air tank 2223 via 2222 in the pressurizing valve 2221 and a reducing valve. moreover -- the pressurizing mechanism 2220 -- pressure KONTORA 2224 -- attachment \*\*\*\*\*.

[0092]It is also possible to replace with the pressurizing mechanism 2220 and to connect a vacuum pump.

[0093]If the 2nd space 2117 is lengthened to the vacuum, it will be kept warm, and the fall of the insulation efficiency by aging of thermal insulation can be compensated with the container 2200 constituted in this way. For example, what is necessary is just to raise a degree of vacuum according to aging.

[0094]In the container 2200 constituted in this way, if the 1st space 2115 is pressurized from the between [ the 2nd empty 2116 ] side via the passage 2210, after a feeding gas is preheated, it will be supplied to the inside of a container (the 1st space 2115). Therefore, the temperature fall of a molten metal can be suppressed small. In particular, in a feeding culmination, it is easy to generate the intermittent regurgitation of a molten metal and a gas, the temperature of a molten metal is taken by the feeding gas in that case, and viscosity becomes large. Therefore, by preheating a feeding gas, the temperature fall of a molten metal can be controlled and pipe clogging can be prevented effectively. In addition, safe stopping hot water supply can also be performed and time which stopping hot water supply takes can be shortened.

[0095]In the container 2200 constituted in this way, by it being made to perform leak of the 1st space 2115 by the leak valve 2230 from the 2nd space 2117 side via the passage 2210, after cooling high temperature gas to some extent, it is leaking from the leak valve 2230. Therefore, the thermal load concerning the leak valve 2230 can be reduced, and improvement in reliability of a device and reinforcement can be attained.

[0096]Drawing 9 is a sectional view of the container concerning a 4th embodiment of this invention.

[0097]In the container 2300 shown in the figure, the pressurizing mechanism 2220 is connected to the 1st space 2115, and the reduced pressure control 2310 is connected to the 2nd space 2117. In the reduced pressure control 2310, the vacuum pump 2312 is connected to the 2nd space 2117, for example via the vacuum valve 2311, and the vacuum meter 2313 and the leak valve 2314 are inserted among them.

[0098]The leak valve 2320 as the 2nd valve is inserted in the passage 2210 which connects the 1st space 2115 and 2nd space 2117, and also the leak valve 2321 as the 1st valve is connected into the package body.

[0099]In the container 2300 of such composition, improvement in the reliability of the time reduction which stopping-hot-water-supply operation takes, or stop operation can be aimed at. That is, the 2nd space 2117 is decompressed, at the time of stopping hot water supply, opens wide the leak valve 2320 as the 2nd valve of the occasion that opens the leak valve 2321 as the 1st valve wide first, and carries out \*\* pressure of the inside of the 1st space

2115, and makes the 1st space 2115 negative pressure. Thereby, pull back by the side of perfect stopping hot water supply and also the container of the molten metal in piping can be performed.

[0100]Drawing 10 is a sectional view of the container concerning a 5th embodiment of this invention.

[0101]In the container 2400 shown in the figure, the piping 2420 which has an inclination which goes up is connected near the package body 2410 pars basilaris ossis occipitalis. The other end of the piping 2420 is prolonged to the position higher than the container 2400 at least.

[0102]Drawing 11 is a sectional view of the container concerning a 6th embodiment of this invention.

[0103]In the container 2500 shown in the figure, the septum 2520 carried out for 2 minutes opening the inside of the package body 2510 for free passage near the lower part and the gutter 2540 which while was divided and was connected to the space 2530 side by the septum 2520 are provided. The pressurizing mechanism 2220 is connected to the space 2531 of another side. The lid 2541 is formed in the upper part of the bucket part 2540.

[0104]In the container 2500 of this embodiment, if the inside of a container is pressurized according to the pressurizing mechanism 2220, the hot water in a container will be breathed out outside via the gutter 2540.

[0105]namely, the time of \*\* maintenance with which \*\* maintenance will be \*\* got blocked very much easily if piping is in the inside of a main part -- with a piping crack -- it is said that it is cheap -- it is problematic.

[0106]On the other hand, in the container 2500 of this embodiment, use the space 2530 instead of piping, for example, it is made to overflow from the opening 2532, and while it dissociated by the septum 2520 carries out hot water supply by the gutter 2540. Even if a maintenance becomes very easy by this, it is moreover hard to get it blocked and it gets it blocked further, it can be made to usually recover by maintenance.

[0107]Drawing 12 is a sectional view of the container concerning a 7th embodiment of this invention.

[0108]The container 2600 shown in the figure removes the lid 2541 arranged in the upper part of the bucket part 2540 in the container shown in drawing 11.

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[Translation done.]

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1]It is a schematic diagram showing the composition of the metal distribution system concerning one embodiment of this invention.

[Drawing 2]It is a figure showing the relation of the container and holding furnace concerning one embodiment of this invention.

[Drawing 3]It is a sectional view of the container concerning one embodiment of this invention.

[Drawing 4]It is a top view of drawing 3.

[Drawing 5]It is a figure showing the composition of the distribution system from the 2nd furnace in the 2nd factory concerning one embodiment of this invention to a container.

[Drawing 6]It is a flow chart showing the manufacturing method of the car using the system of this invention.

[Drawing 7]It is a sectional view of the container concerning a 2nd embodiment.

[Drawing 8]It is a sectional view of the container concerning a 3rd embodiment.

[Drawing 9]It is a sectional view of the container concerning a 4th embodiment.

[Drawing 10]It is a sectional view of the container concerning a 5th embodiment.

[Drawing 11]It is a sectional view of the container concerning a 6th embodiment.

[Drawing 12]It is a sectional view of the container concerning a 7th embodiment.

[Description of Notations]

50 Package body

51 and 60 Opening

57 Channel

62 Hatch

65 The breakthrough for internal pressure adjustment

66 Piping for internal pressure adjustment

60 Opening

100 The container for molten-metal supply

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[Translation done.]



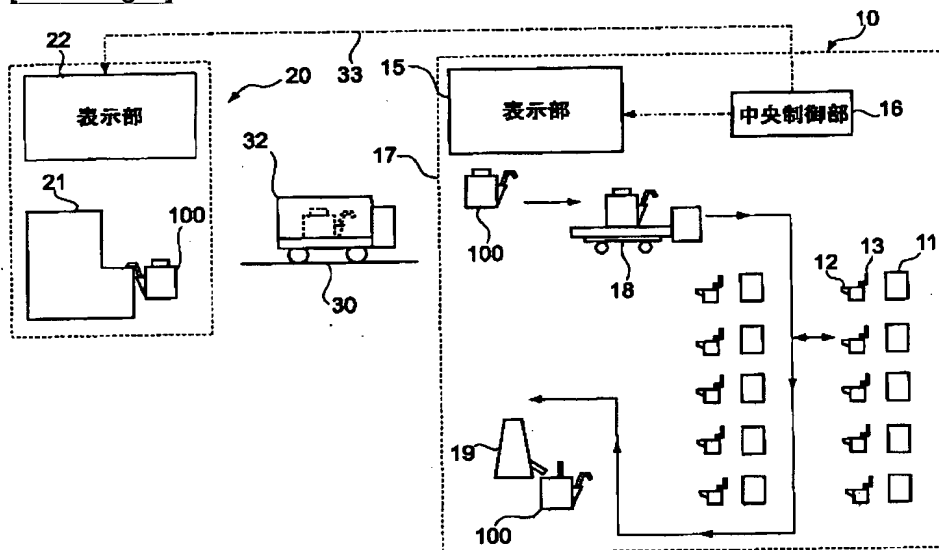
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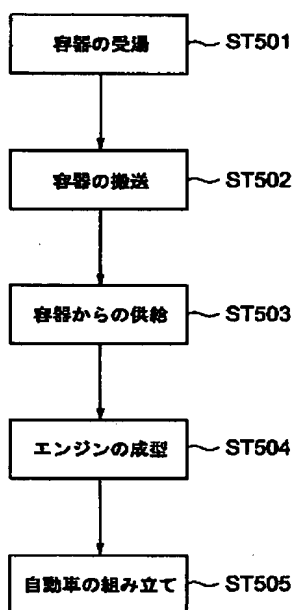
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## DRAWINGS

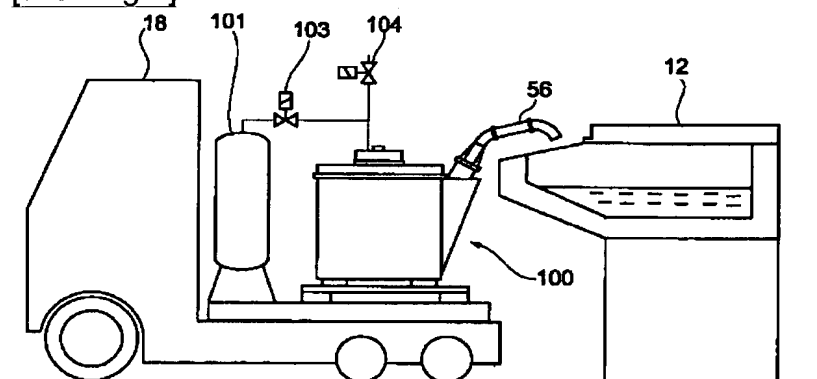
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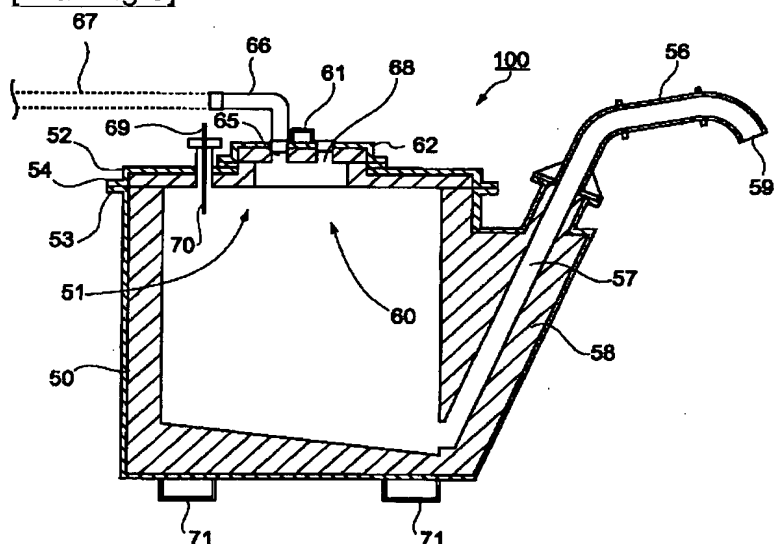
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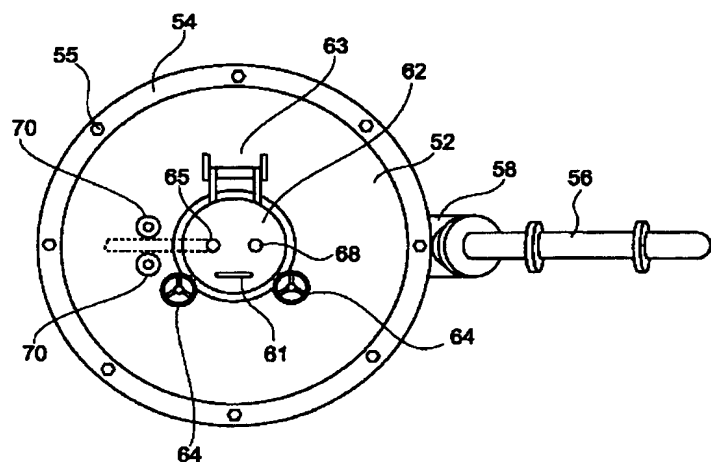
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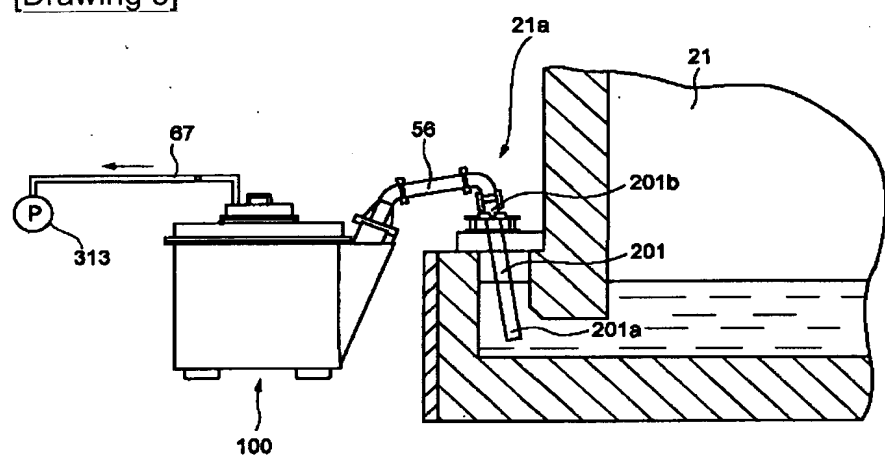
[Drawing 3]



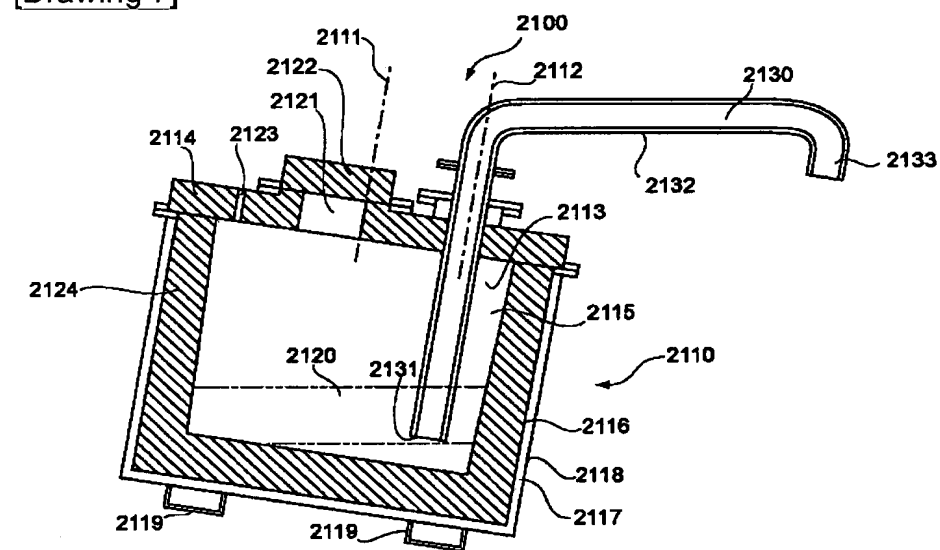
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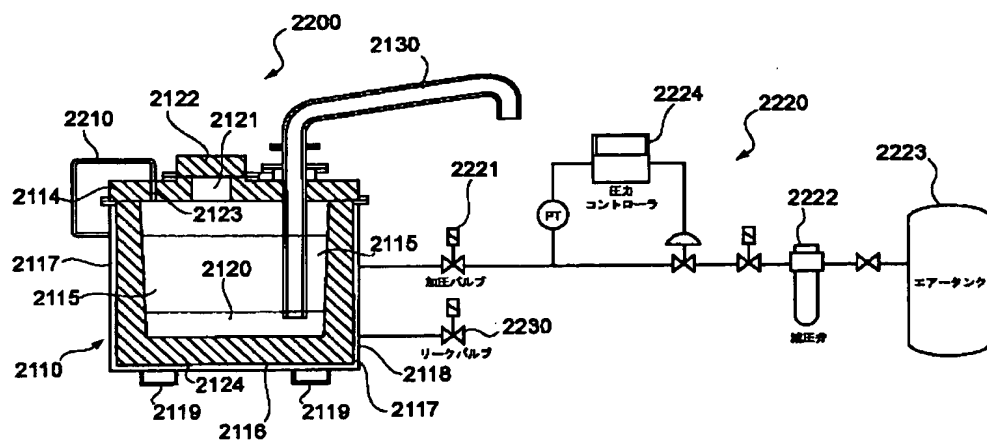
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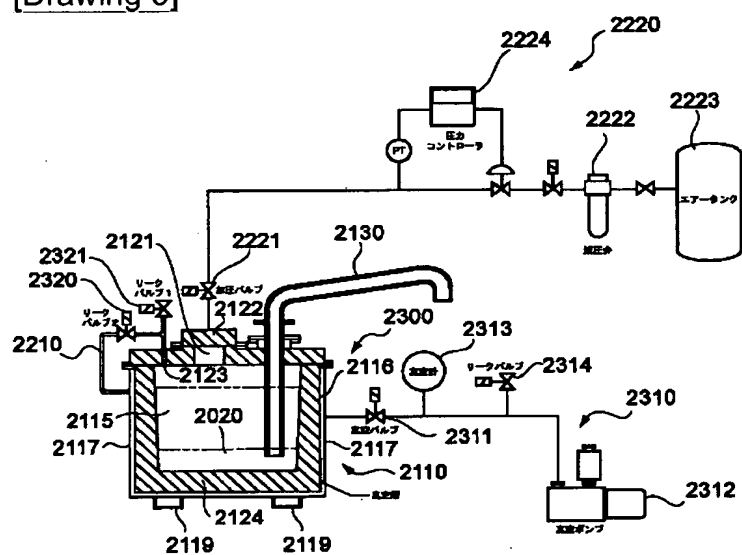
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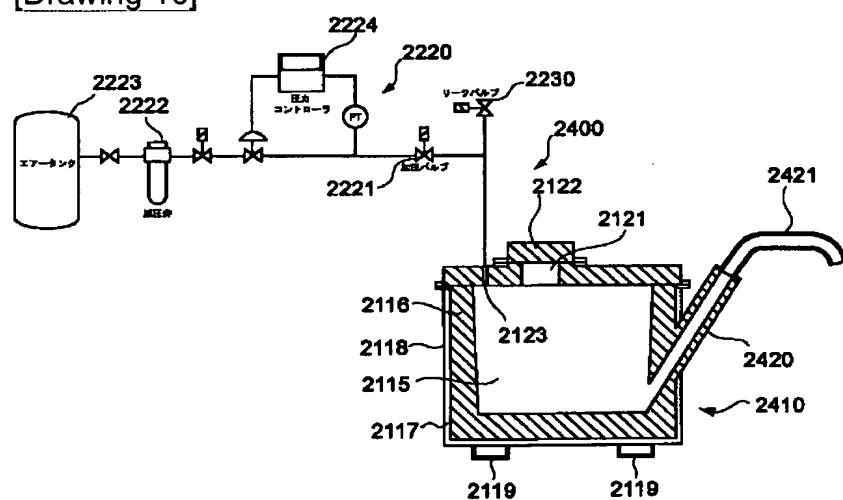
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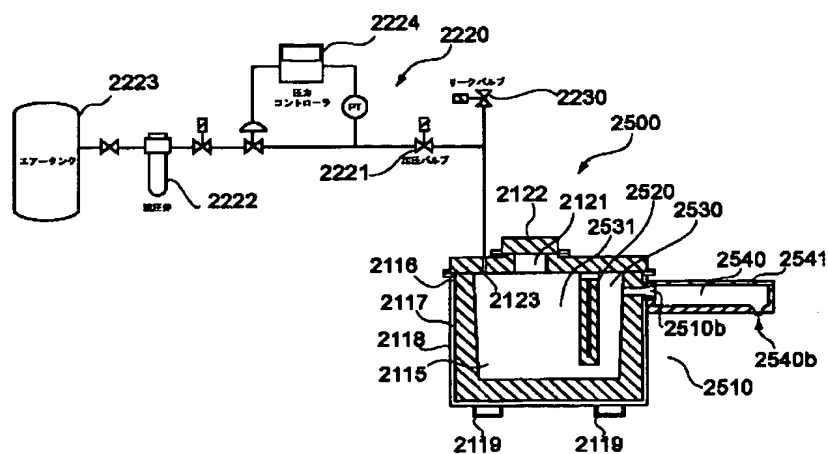
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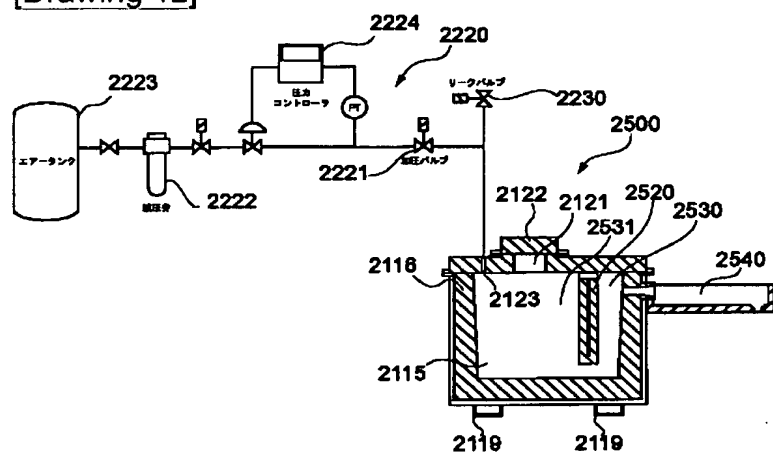
[Drawing 10]



[Drawing 11]



[Drawing 12]



[Translation done.]

\* NOTICES \*

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

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WRITTEN AMENDMENT

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----- [Written amendment]

[Filing date]December 5, Heisei 13 (2001.12.5)

[Amendment 1]

[Document to be Amended]Specification

[Item(s) to be Amended]Claim

[Method of Amendment]Change

[Proposed Amendment]

[Claim(s)]

[Claim 1]A container which can accommodate molten metal,

A hatch in which it was provided in an upper face part of said container so that opening and closing were possible, and a breakthrough for internal pressure adjustment which opens inside and outside of said container for free passage was provided,

A container for molten-metal supply possessing a channel which it is provided in a position which is an upper face part of said container, and is separated from the center of this upper face part rather than distance to said breakthrough, and inside and outside of said container are opened for free passage, and can be circulated in said molten metal.

[Claim 2]A container which can accommodate molten metal,

A hatch in which it was provided in an upper face part of said container so that opening and closing were possible, and a breakthrough for internal pressure adjustment which opens inside and outside of said container for free passage was provided,

A container for molten-metal supply possessing a channel which it is provided in the side of said container, and inside and outside of said container are opened for free passage, and can be circulated in said molten metal.

[Claim 3]In the container for molten-metal supply according to claim 1 or 2,

A container for molten-metal supply with which said hatch is characterized by a thing of an upper face part of said container mostly established in the center.

[Claim 4]In a container for molten-metal supply given in any 1 paragraph among claim 1 to

claims 3,

A container for molten-metal supply, wherein it is attached to said breakthrough, and it projects towards the upper part from an upper face part of said container, and is horizontally bent in a position of predetermined height and a terminal area possesses further piping drawn horizontally.

[Claim 5]In the container for molten-metal supply according to claim 4,

A container for molten-metal supply, wherein said piping is screwed on said breakthrough removable.

[Claim 6]A container which can accommodate molten metal, opens inside and outside for free passage, and has a breakthrough for internal pressure adjustment of an upper face part mostly provided in a main position,

A container for molten-metal supply possessing a channel which it is provided in a position which is an upper face part of said container, and is separated from the center of this upper face part rather than distance to said breakthrough, and inside and outside of said container are opened for free passage, and can be circulated in said molten metal.

[Claim 7]A container which can accommodate molten metal, opens inside and outside for free passage, and has a breakthrough for internal pressure adjustment of an upper face part mostly provided in a main position,

A container for molten-metal supply possessing a channel which it is provided in the side of said container, and inside and outside of said container are opened for free passage, and can be circulated in said molten metal.

[Claim 8]In the container for molten-metal supply according to claim 6 or 7,

Said container possesses further a hatch of an upper face part of the container concerned mostly provided in the central part,

A container for molten-metal supply, wherein said breakthrough is provided in said hatch.

[Claim 9]In a container for molten-metal supply given in any 1 paragraph among claim 6 to claims 8,

A container for molten-metal supply, wherein can attach to said breakthrough, and it projects towards the upper part from an upper face part of said container, and is horizontally bent in a position of predetermined height and a terminal area possesses further piping drawn horizontally.

[Claim 10]In the container for molten-metal supply according to claim 9,

A container for molten-metal supply, wherein said piping is screwed on said container removable.

[Claim 11]A container which can accommodate molten metal and has the 1st opening in the upper part,

A channel which inside and outside of said container are opened for free passage and can be circulated in said molten metal,

A lid which is arranged so that the 1st opening of said container may be covered, and has the 2nd opening of a byway rather than said 1st opening in the center mostly,

A container for molten-metal supply possessing a hatch in which it was provided in an upper face part of said lid so that opening and closing were possible, and a breakthrough for internal pressure adjustment which opens inside and outside of said container for free passage was provided.

[Claim 12]In the container for molten-metal supply according to claim 11,

A container for molten-metal supply, wherein it is attached to said breakthrough, and it projects towards the upper part from an upper face part of said container, and is horizontally bent in a position of predetermined height and a terminal area possesses further piping drawn horizontally.

[Claim 13]In the container for molten-metal supply according to claim 12,

A container for molten-metal supply, wherein said piping is screwed on said breakthrough removable.

----- [A written amendment]

[Filing date]March 4, Heisei 14 (2002.3.4)

[The amendment 1]

[Document to be Amended]Specification

[Item(s) to be Amended]Claim

[Method of Amendment]Change

[Proposed Amendment]

[Claim(s)]

[Claim 1]A container which can accommodate molten metal and has the 1st opening in the upper part,

A channel which inside and outside of said container are opened for free passage and can be circulated in said molten metal,

A lid which is arranged so that the 1st opening of said container may be covered, and has the 2nd opening of a byway rather than said 1st opening in the center mostly,

A container for molten-metal supply possessing a hatch in which it was provided in an upper face part of said lid so that opening and closing were possible, and a breakthrough for internal pressure adjustment which opens inside and outside of said container for free passage was provided.

[Claim 2]In the container for molten-metal supply according to claim 1,

A container for molten-metal supply, wherein it is attached to said breakthrough, and it projects towards the upper part from an upper face part of said container, and is horizontally bent in a position of predetermined height and a terminal area possesses further piping drawn horizontally.

[Claim 3]In the container for molten-metal supply according to claim 2,

A container for molten-metal supply, wherein said piping is screwed on said breakthrough removable.



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[Translation done.]

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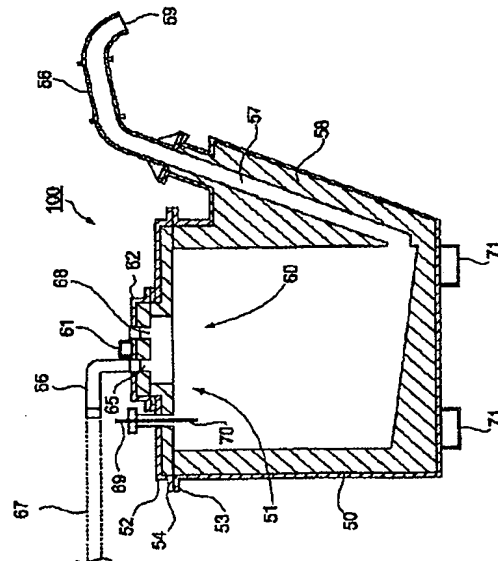
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(33) 優先権主張国	日本 (J P)	Fターム(参考)	4E014 AB02 HA00 HA01 LA04 LA09 LA10

(54) 【発明の名称】 溶融金属供給用容器

(57) 【要約】

【課題】 内圧調整に用いるための配管や孔の詰りを防止すること。

【解決手段】 溶融したアルミニウム等の溶融金属を供給するために用いる容器であって、ハッチ62に内圧調整用の貫通孔65を設け、その貫通孔65に内圧調整用の配管66を接続しているので、容器100内に溶融金属を供給する度に内圧調整用の貫通孔65に対する金属の付着を確認することができる。従って、内圧調整に用いるための配管66や貫通孔65の詰りを未然に防止することができる。



【特許請求の範囲】

【請求項1】 熔融金属を収容することができる容器と、  
前記容器の内外を連通し、前記熔融金属を流通することが可能な流路と、  
前記容器の上面部に開閉可能に設けられ、前記容器の内外を連通する内圧調整用の貫通孔が設けられたハッチとを具備することを特徴とする熔融金属供給用容器。  
【請求項2】 請求項1に記載の熔融金属供給用容器において、  
前記ハッチは、前記容器の上面部のほぼ中央に設けられていることを特徴とする熔融金属供給用容器。  
【請求項3】 請求項1又は請求項2に記載の熔融金属供給用容器において、  
前記貫通孔に取り付けられ、前記容器の上面部から上方に向けて突出し、所定の高さの位置で水平方向に折り曲げられ、水平方向に導出された配管を更に具備することを特徴とする熔融金属供給用容器。  
【請求項4】 請求項3に記載の熔融金属供給用容器において、  
前記配管は、前記貫通孔に着脱可能に螺着されていることを特徴とする熔融金属供給用容器。  
【請求項5】 熔融金属を収容することができ、内外を連通し、上面部のほぼ中心の位置に設けられた内圧調整用の貫通孔を有する容器と、  
前記容器の内外を連通し、前記熔融金属を流通することが可能な流路とを具備したことを特徴とする熔融金属供給用容器。  
【請求項6】 請求項5に記載の熔融金属供給用容器において、  
前記容器は、当該容器の上面部のほぼ中心部に設けられたハッチを更に具備し、  
前記貫通孔は、前記ハッチに設けられていることを特徴とする熔融金属供給用容器。  
【請求項7】 請求項5又は請求項6に記載の熔融金属供給用容器において、  
前記貫通孔に取り付けられ、前記容器の上面部から上方に向けて突出し、所定の高さの位置で水平方向に折り曲げられ、水平方向に導出された配管を更に具備することを特徴とする熔融金属供給用容器。  
【請求項8】 請求項7に記載の熔融金属供給用容器において、  
前記配管は、前記容器に着脱可能に螺着されていることを特徴とする熔融金属供給用容器。  
【請求項9】 熔融金属を収容することができ、上部に第1の開口部を有する容器と、  
前記容器の内外を連通し、前記熔融金属を流通することが可能な流路と、  
前記容器の第1の開口部を覆うように固定的に配置され、ほぼ中央に前記第1の開口部よりも小径の第2の開

口部を有する蓋と、

前記蓋の上面部に開閉可能に設けられ、前記容器の内外を連通する内圧調整用の貫通孔が設けられたハッチとを具備することを特徴とする熔融金属供給用容器。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、例えば熔融したアルミニウムの運搬に用いられる熔融金属供給用容器に関する。

【0002】

【従来の技術】 多数のダイキャストマシンを使ってアルミニウムの成型が行われる工場では、工場内ばかりでなく、工場外からアルミニウム材料の供給を受けることが多い。この場合、熔融した状態のアルミニウムを収容した取鍋を材料供給側の工場から成型側の工場へと搬送し、熔融した状態のままの材料を各ダイキャストマシンへ供給することが行われている。

【0003】 従来から用いられている取鍋は、熔融金属が貯留される容器本体の側壁に供給用の配管を取り付けたいわば急須のような構造で、かかる取鍋を傾けることにより配管から成型側の保持炉に熔融金属を供給することが行われている。

【0004】

【発明が解決しようとする課題】 しかしながら、このような取鍋では、例えば取鍋の傾斜をフォークリフトを用いて行っており、そのような作業は必ずしも安全なものとはいえなかった。また、取鍋を傾斜させるためにフォークリフトに回転機構を設ける必要があるため、構成が特殊となり、更にそのような操作のためにフォークリフトの操作に熟練した作業員が必要とされる、という課題があった。

【0005】 そのため、本発明者等は、圧力差を利用した熔融金属の供給システムを提唱している。このシステムは、密閉された容器に外部に熔融金属を導出するための配管を設け、さらにこの容器に加圧気体を供給するための配管を接続し、容器内を加圧することで金属導出用の配管から外部の例えば成型側の保持炉に熔融金属を導出している。

【0006】 しかしながら、上記構成の容器では、加圧気体供給用の配管が詰り易い、という問題がある。特に、上記のシステムでは、例えば容器はトラックに搭載され公道を介して工場から他の工場に運搬されるために揺れることが多く、このため容器内の熔融金属の液面が傾いたり、液滴が容器内で飛び散り、これらが加圧気体供給用の配管に付着する。そして、例えばこのような付着が度重なることで配管詰りが発生している。

【0007】 以上の事情に鑑み、本発明の主たる目的は、内圧調整に用いるための配管や孔の詰りを防止することができる熔融金属供給用容器を提供することにある。

【０００８】

【課題を解決するための手段】かかる課題を解決するため、本発明の主たる観点に係る熔融金属供給システムは、熔融金属を収容することができる容器と、前記容器の内外を連通し、前記熔融金属を流通することが可能な流路と、前記容器の上面部に開閉可能に設けられ、前記容器の内外を連通する内圧調整用の貫通孔が設けられたハッチとを具備するものである。

【０００９】通常、かかる容器内に熔融金属を供給するに先立ちガスバーナ等の加熱器により容器を予熱している。この予熱は、ハッチを開けて加熱器の一部を容器内に挿入することで行われる。従って、ハッチは容器内に熔融金属を供給する度に開けられるものである。本発明では、このようなハッチに内圧調整用の貫通孔を設けているので、容器内に熔融金属を供給する度に内圧調整用の貫通孔に対する金属の付着を確認することができる。そして、例えば貫通孔に金属が付着しているときにはその部度それを剥がせばよい。従って、本発明では、内圧調整に用いるための配管や孔の詰りを未然に防止することができる。また本発明においては、このハッチは容器内部を気密を確保するためのパッキン等の封止部材を備えている。パッキンは例えばシリコン製のものなど耐熱性を有するものが好ましい。

【００１０】本発明の熔融金属供給用容器は、前記ハッチが、前記容器の上面部のほぼ中央に設けられていることを特徴とするものである。

【００１１】容器が揺れて液面が傾いたり、液滴が飛び散る場合、容器内の外周付近よりも中央部に近い方がより液面の変化や液滴が飛び散る度合いが小さい。本発明では、ハッチに内圧調整用の貫通孔が設けられ、しかもそのハッチが上記のように液面の変化や液滴が飛び散る度合いが小さい位置に対応する容器の上面部のほぼ中央に設けられているので、金属が内圧調整に用いるための配管や孔に付着することが少なくなる。従って、本発明では、内圧調整に用いるための配管や孔の詰りを防止することができる。

【００１２】本発明の熔融金属供給用容器は、前記貫通孔に取り付けられ、前記容器の上面部から上方に向けて突出し、所定の高さの位置で水平方向に折り曲げられ、水平方向に導出された配管を更に具備するものである。

【００１３】本発明に係る容器が使われるシステムでは、例えば貫通孔に取り付けられた配管に加圧気体供給用のタンクや減圧用のポンプからの配管が接続される。そのような接続は、容器内に熔融金属を導入する度、或いは容器内から熔融金属を導出する度に行われる。一方、熔融金属が貯留される容器は非常に高温であり、作業性が悪い状態にある。本発明に係る容器では、内圧調整用の貫通孔が容器上面のほぼ中央にある構成であり、そのまま上方に伸びる配管を取り付けたのでは上記のような配管間の接続の作業性が非常に悪い。これに対し

て、上記のように配管が水平方向に導出するような構成とすることで、例えば作業者が配管間の接続ポイントに手を伸ばして作業を安全にかつ簡単に行うことができる。

【００１４】本発明の熔融金属供給用容器は、前記配管が前記貫通孔に着脱可能に螺着されていることを特徴とするものである。

【００１５】本発明では、配管を貫通孔に対して着脱可能に螺着するように構成することで、水平方向に導出されている配管自体をいわばスパナのような用い方で配管を貫通孔から着脱すること可能となる。従って、配管の着脱を特別な工具等を用いることなく簡単に行うことができる。これにより、例えば配管の詰まり具合をしばしば確認することが可能となり、内圧調整に用いるための配管の詰りを未然に防止することができる。

【００１６】本発明の別の観点に係る熔融金属供給用容器は、熔融金属を収容することができ、内外を連通し、上面部のほぼ中心の位置に設けられた内圧調整用の貫通孔を有する容器と、前記容器の内外を連通し、前記熔融金属を流通することが可能な流路とを具備したことを特徴とするものである。

【００１７】上述したように容器が揺れて液面が傾いたり、液滴が飛び散る場合、容器内の外周付近よりも中央部に近い方がより液面の変化や液滴が飛び散る度合いが小さい。本発明では、内圧調整用の貫通孔がこのように液面の変化や液滴が飛び散る度合いが小さい位置に対応する容器の上面部のほぼ中央に設けられているので、金属が内圧調整に用いるための配管や孔に付着することが少なくなる。従って、本発明では、内圧調整に用いるための配管や孔の詰りを防止することができる。

【００１８】本発明の熔融金属供給用容器は、前記容器は、当該容器の上面部のほぼ中心部に設けられたハッチを更に具備し、前記貫通孔は、前記ハッチに設けられていることを特徴とするものである。

【００１９】上述したように、通常、容器内に熔融金属を供給するに先立ちガスバーナにより容器を予熱している。この予熱は、ハッチを開けてガスバーナを容器内に挿入することで行われる。従って、ハッチは容器内に熔融金属を供給する度に開けられるものである。本発明では、このようなハッチに内圧調整用の貫通孔を設けているので、容器内に熔融金属を供給する度に内圧調整用の貫通孔に対する金属の付着を確認することができる。そして、例えば貫通孔に金属が付着しているときにはその部度それを剥がせばよい。従って、本発明では、内圧調整に用いるための配管や孔の詰りを未然に防止することができる。

【００２０】本発明の熔融金属供給用容器は、前記貫通孔に取り付けられ、前記容器の上面部から上方に向けて突出し、所定の高さの位置で水平方向に折り曲げられ、水平方向に導出された配管を更に具備するものである。

【００２１】本発明の更に別の観点に係る溶融金属供給用容器は、溶融金属を収容することができ、上部に第１の開口部を有する容器と、前記容器の内外を連通し、前記溶融金属を流通することが可能な流路と、前記容器の第１の開口部を覆うように固定的に配置され、ほぼ中央に前記第１の開口部よりも小径の第２の開口部を有する蓋と、前記蓋の上面部に開閉可能に設けられ、前記容器の内外を連通する内圧調整用の貫通孔が設けられたハッチとを具備するものである。

【００２２】本発明では、このようなハッチに内圧調整用の貫通孔を設けているので、容器内に溶融金属を供給する度に内圧調整用の貫通孔に対する金属の付着を確認することができる。従って、本発明では、内圧調整に用いるための配管や孔の詰りを未然に防止することができる。本発明では、ハッチに内圧調整用の貫通孔が設けられ、しかもそのハッチが上記のように液面の変化や液滴が飛び散る度合いが小さい位置に対応する容器の上面部のほぼ中央に設けられているので、金属が内圧調整に用いるための配管や孔に付着することが少なくなる。従って、本発明では、内圧調整に用いるための配管や孔の詰りを防止することができる。更に、本発明では、ハッチが蓋の上面部に設けられているので、ハッチの裏面と液面との距離が蓋の裏面と液面との距離に比べて蓋の厚み分だけ長くなる。従って、貫通孔が設けられたハッチの裏面に金属が付着する可能性が低くなる。よって、本発明では、内圧調整に用いるための配管や孔の詰りを防止することができる。

【００２３】上記容器としては、容器本体と、前記容器本体の中心からずれた位置から容器本体外に配設された配管とを具備するようにしても構わない。

【００２４】配管が容器内で溶湯に浸かったままだとすぐに詰まってしまうのに対して、本発明では、配管が容器本体の中心からずれているので、傾けたときに容器内の液面に対する変位が大きくなり、この状態で溶湯を吐き出した後水平に戻すと配管下端と溶湯面との間に空間ができ、配管詰まりが防止される。

【００２５】本発明の容器は、第１の空間を構成する第１のフレームと、前記第１のフレームとの間に第２の空間を構成するように配設された第２のフレームと、前記第１の空間と前記第２の空間とを接続する少なくとも１つの通路とを具備する。

【００２６】本発明では、第２の空間を真空に引いておけば保温になり、断熱材の経時変化による断熱性能の低下を補償することができる。また、通路を介して第２の空間側から第１の空間を加圧すると、圧送気体は予熱されてから容器内部に供給される。従って、溶湯の温度低下を小さく抑えることができる。特に、圧送最終段階においては溶湯と気体の間欠吐出が発生しやすく、その場合に溶湯の温度が圧送気体に奪われて粘性が大きくなる。従って、圧送気体を予熱することで、溶湯の温度低

下を抑制し、配管詰まりを効果的に防止することができ、加えて、安全な給湯停止もでき、給湯停止に要する時間を短くすることができる。

【００２７】また、本発明では、第１の空間のリークを通路を介して第２の空間側から行うようにすることができる。圧送停止時には加圧された第１の空間の気体をリークして常圧に復圧するが、そのとき第１の空間の気体は溶湯と共存しているから非常に高温であり、この高温気体を直接的にリークしたのではリークバルブを痛めることになる。これに対して、第１の空間のリークを通路を介して第２の空間側から行うことで、リークバルブにかかる熱的負荷を軽減し、装置の信頼性向上、長寿命化を図ることができる。

【００２８】本発明の容器は、第１の空間を構成する第１のフレームと、前記第１のフレームとの間に第２の空間を構成するように配設された第２のフレームと、前記第１の空間と前記第２の空間とを接続する少なくとも１つの通路と、前記容器本体内部と接続された第１のバルブと、前記通路上に介挿された第２のバルブとを具備する。

【００２９】本発明では、給湯停止動作に要する時間短縮、もしくは停止動作の信頼性の向上を図ることができる。すなわち、第２の空間は減圧しておき、給湯停止時には、まず第１のバルブを開放して第１の空間内を復圧する。ついで第２のバルブを開放し第１の空間を負圧にする。これにより完全な給湯停止、更には配管内の溶湯の容器側への引き戻しができる。

【００３０】本発明の容器は、容器本体と、容器本体底部付近に接続され、少なくとも上方に向かう傾斜を有する配管とを具備する。

【００３１】本発明の容器は、容器本体と、容器本体内部を下部付近で連通しつつ２分する隔壁と、前記隔壁の区切られた一方の空間側に接続された樋部とを具備する。

【００３２】本発明の容器は、容器本体と、容器本体内部を下部付近で連通しつつ２分する隔壁と、前記隔壁の分離された一方の空間側に接続された樋部と、前記樋部上に設けられた蓋とを具備する。

【００３３】すなわち、配管が本体内部にあると、メンテナンスが不要

詰まりやすい  
メンテナンス時に配管傷つきやすい  
という問題ある。

【００３４】本発明では、隔壁で分離された一方の空間を配管の代わりに使用し、例えば開口部からオーバーフローさせて樋部で給湯するものである。これによりメンテナンスが非常に簡単になり、しかも詰まりにくく、更には詰まっても通常メンテナンスで回復させることができる。

【００３５】

【発明の実施の形態】以下、本発明の実施の形態を図面

に基づき説明する。

【0036】図1は本発明の一実施形態に係る金属供給システムの全体構成を示す図である。

【0037】同図に示すように、第1の工場10と第2の工場20とは例えば公道30を介して離れた所に設けられている。

【0038】第1の工場10には、ユースポイントとしてのダイキャストマシン11が複数配置されている。各ダイキャストマシン11は、溶融したアルミニウムを原材料として用い、射出成型により所望の形状の製品を成型するものである。その製品としては例えば自動車のエンジンに関連する部品等を挙げることができる。また、溶融した金属としてはアルミニウム合金ばかりでなくマグネシウム、チタン等の他の金属を主体とした合金であっても勿論構わない。各ダイキャストマシン11の近くには、ショット前の溶融したアルミニウムを一旦貯留する保持炉（手元保持炉）12が配置されている。この保持炉12には、複数ショット分の溶融アルミニウムが貯留されるようになっており、ワンショット毎にラドル13或いは配管を介して保持炉12からダイキャストマシン11に溶融アルミニウムが注入されるようになっており、また、各保持炉12には、容器内に貯留された溶融アルミニウムの液面を検出する液面検出センサ（図示せず）や溶融アルミニウムの温度を検出するための温度センサ（図示せず）が配置されている。これらのセンサによる検出結果は各ダイキャストマシン11の制御盤もしくは第1の工場10の中央制御部16に伝達されるようになっており、

【0039】第1の工場10の受け入れ部には、後述する容器100を受け入れるための受け入れ台17が配置されている。受け入れ部の受け入れ台17で受け入れられた容器100は、配送車18により所定のダイキャストマシン11まで配送され、容器100から保持炉12に溶融アルミニウムが供給されるようになっており、供給の終了した容器100は配送車18により再び受け入れ部の受け入れ台17に戻されるようになっており、

【0040】第1の工場10には、アルミニウムを溶融して容器100に供給するための第1の炉19が設けられており、この第1の炉19により溶融アルミニウムが供給された容器100も配送車18により所定のダイキャストマシン11まで配送されるようになっており、

【0041】第1の工場10には、各ダイキャストマシン11において溶融アルミニウムの追加が必要になった場合にそれを表示する表示部15が配置されている。より具体的には、例えばダイキャストマシン11毎に固有の番号が振られ、表示部15にはその番号が表示されており、溶融アルミニウムの追加が必要になったダイキャストマシン11の番号に対応する表示部15における番号が点灯するようになっており、作業者はこの表示部15の表示に基づき配送車18を使って容器100

をその番号に対応するダイキャストマシン11まで運び溶融アルミニウムを供給する。表示部15における表示は、液面検出センサによる検出結果に基づき、中央制御部16が制御することによって行われる。

【0042】第2の工場20には、アルミニウムを溶融して容器100に供給するための第2の炉21が設けられている。容器100は例えば容量、配管長、高さ、幅等の異なる複数種が用意されている。例えば第1の工場10内のダイキャストマシン11における保持炉12の容量等に応じて、容量の異なる複数種がある。しかしながら、容器100を1種類に統一して規格化しても勿論構わない。

【0043】この第2の炉21により溶融アルミニウムが供給された容器100は、フォークリフト（図示せず）により搬送用のトラック32に載せられる。トラック32は公道30を通り第1の工場10における受け入れ部の受け入れ台17の近くまで容器100を運び、これらの容器100はフォークリフト（図示せず）により受け入れ台17に受け入れられるようになっており、また、受け入れ部にある空の容器100はトラック32により第2の工場20へ返送されるようになっており、

【0044】第2の工場20には、第1の工場10における各ダイキャストマシン11において溶融アルミニウムの追加が必要になった場合にそれを表示する表示部22が配置されている。表示部22の構成は第1の工場10内に配置された表示部15とほぼ同様である。表示部22における表示は、例えば通信回線33を介して第1の工場10における中央制御部16が制御することによって行われる。なお、第2の工場20における表示部22においては、溶融アルミニウムの供給を必要とするダイキャストマシン11のうち第1の工場10における第1の炉19から溶融アルミニウムが供給されると決定されたダイキャストマシン11はそれ以外のダイキャストマシン11とは区別して表示されるようになっており、例えば、そのように決定されたダイキャストマシン11に対応する番号は点滅するようになっており、これにより、第1の炉19から溶融アルミニウムが供給されると決定されたダイキャストマシン11に対して第2の工場20側から誤って溶融アルミニウムを供給するようなことをなくすることができる。また、この表示部22には、上記の他に中央制御部16から送信されたデータも表示されるようになっており、

【0045】次に、このように構成された金属供給システムの動作を説明する。

【0046】中央制御部16では、各保持炉12に設けられた液面検出センサを介して各保持炉12における溶融アルミニウムの量を監視している。ここで、ある保持炉12で溶融アルミニウムの供給の必要性が生じた場合に、中央制御部16は、その保持炉12の「固有の番号」、その保持炉12に設けられた温度センサにより検

出された保持炉12の「温度データ」、その保持炉12の形態（後述する。）に関する「形態データ」、その保持炉12から溶融アルミニウムがなくなる最終的な「時刻データ」、公道30の「トラフィックデータ」、その保持炉12で要求される溶融アルミニウムの「量データ」及び「気温データ」等を、通信回線33を介して第2の工場20側に送信する。第2の工場20では、これらのデータを表示部22に表示する。これらの表示されたデータに基づき作業者が経験的に上記保持炉12から溶融アルミニウムがなくなる直前に保持炉12に容器100が届き、且つその時の溶融アルミニウムが所望の温度となるように該第2の工場20からの容器100の発送時刻及び溶融アルミニウムの発送時の温度を決定する。或いはこれらのデータを例えばパソコン（図示せず）に取り込んで所定のソフトウェアを用いて上記保持炉12から溶融アルミニウムがなくなる直前に保持炉12に容器100が届き、且つその時の溶融アルミニウムが所望の温度となるように該第2の工場20からの容器100の発送時刻及び溶融アルミニウムの発送時の温度を推定してその時刻及び温度を表示するようにしてもよい。或いは推定された温度により第2の炉21を自動的に温度制御しても良い。容器100に収容すべき溶融アルミニウムの量についても上記「量データ」に基づき決定してもよい。

【0047】 発送時刻に容器100を載せたトラック32が出発し、公道30を通り第1の工場10に到着すると、容器100がトラック32から受け入れ部の受け入れ台17に受け入れられる。

【0048】 その後、受け入れられた容器100は、受け入れ台17と共に配送車18により所定のダイキャストマシン11まで配送され、容器100から保持炉12に溶融アルミニウムが供給される。

【0049】 図2に示すように、この例では、レシーバタンク101から高圧空気を密閉された容器100内に送出することで容器100内に収容された溶融アルミニウムが配管56から吐出されて保持炉12内に供給されるようになっている。なお、図2において、103は加圧バルブ、104はリークバルブである。

【0050】 ここで、保持炉12の高さは各種のものがあ、り、配送車18に設けられた昇降機構により配管56の先端が保持炉12上の最適位置となるように調節可能になっている。しかし、保持炉12の高さによっては昇降機構だけでは対応できない場合がある。そこで、本システムにおいては、保持炉12の形態に関する「形態データ」として、保持炉12の高さや保持炉12までの距離に関するデータ等を予め第2の工場20側に送り、第2の工場20側ではこのデータに基づき最適な形態、例えば最適な高さの容器100を選択して配送している。なお、供給すべき量に応じて最適な大きさの容器100を選択して配送してもよい。

【0061】 次に、このように構成されたシステムに好適な容器（加圧式溶融金属供給容器）100について、図3及び図4に基づき説明する。図3は容器100の断面図、図4はその平面図である。

【0062】 容器100は、有底で筒状の本体50の上部開口部51に大蓋52が配置されている。本体50及び大蓋51の外周にはそれぞれフランジ53、54が設けられており、これらフランジ間をボルト55で締めることで本体50と大蓋51が固定されている。なお、本体50や大蓋51は例えば外側が金属であり、内側が耐火材料及び断熱材により構成されている。

【0063】 本体50の外周の1箇所には、本体50内部から配管56に連通する流路57が設けられた配管取付部58が設けられ、この配管取付部58の流路57に連通するように配管56が固定されている。配管56は、「U」状の形状を有しており、これにより配管56の一端口59は下方を向いている。より具体的には、配管56の一端口59は垂線に対して例えば10°程度傾いている。このように傾斜を持たせることによって例えば一端口59から導出される溶融金属がサーバ側に流れ落ちた際に湯面から湯滴が飛び散ることが少なくなる。

【0064】 上記の大蓋52のほぼ中央には開口部60が設けられ、開口部60には取っ手61が取り付けられたハッチ62が配置されている。ハッチ62は大蓋52上面よりも少し高い位置に設けられて、ハッチ62の外周の1ヶ所にはヒンジ63を介して大蓋52に取り付けられている。これにより、ハッチ62は大蓋52の開口部60に対して開閉可能とされている。また、このヒンジ63が取り付けられた位置と対向するように、ハッチ62の外周の2ヶ所には、ハッチ62を大蓋52に固定するためのハンドル付のボルト64が取り付けられている。大蓋52の開口部60をハッチ62で開けてハンドル付のボルト64を回動することでハッチ62が大蓋52に固定されることになる。また、ハンドル付のボルト64を逆回転させて締結を開放してハッチ62を大蓋52の開口部60から開くことができる。そして、ハッチ62を開いた状態で開口部60を介して容器100内部のメンテナンスや予熱時のガスバーナの挿入が行われるようになっている。

【0065】 また、ハッチ62の中央、或いは中央から少しずれた位置には、容器100内の減圧及び加圧を行うための内圧調整用の貫通孔65が設けられている。この貫通孔65には加減圧用の配管66が接続されている。この配管66は、貫通孔65から上方に伸びて所定の高さで曲がりそこから水平方向に延在している。この配管66の貫通孔65への挿入部分の表面には螺子山がきられており、一方貫通孔65にも螺子山がきられており、これにより配管66が貫通孔65に対して螺子止めにより固定されるようになっている。

【0066】 この配管66の一方には、加圧用又は減圧

用の配管67が接続可能になっており、加圧用の配管には加圧気体に蓄積されたタンクや加圧用のポンプが接続されており、減圧用の配管には減圧用のポンプが接続されている。そして、減圧により圧力差を利用して配管56及び流路57を介して容器100内に溶融アルミニウムを導入することが可能であり、加圧により圧力差を利用して流路57及び配管56を介して容器100外への溶融アルミニウムの導出が可能である。なお、加圧気体として不活性気体、例えば窒素ガスを用いることで加圧時の溶融アルミニウムの酸化をより効果的に防止することができる。

【0057】本実施形態では、大蓋52のほぼ中央部に配置されたハッチ62に加減圧用の貫通孔65が設けられている一方で、上記の配管66が水平方向に延在しているので、加圧用又は減圧用の配管67を上記の配管66に接続する作業を安全にかつ簡単にを行うことができる。また、このように配管66が延在することによって配管66を貫通孔65に対して小さな力で回転させることができるので、貫通孔65に対して締り止めされた配管66の固定や取り外しを非常に小さな力で、例えば工具を用いることなく行うことができる。

【0058】ハッチ62の中央から少しずれた位置で前記の加減圧用の貫通孔65とは対向する位置には、圧力開放用の貫通孔68が設けられ、圧力開放用の貫通孔68には、リリースバルブ（図示を省略）が取り付けられるようになっている。これにより、例えば容器100内が所定の圧力以上となったときには安全性の観点から容器100内が大気圧に開放されるようになっている。

【0059】大蓋52には、液面センサとしての2本の電極69がそれぞれ挿入される液面センサ用の2つの貫通孔70が所定の間隔をもって配置されている。これらの貫通孔70には、それぞれ電極69が挿入されている。これら電極69は容器100内で対向するように配置されており、それぞれの先端は例えば容器100内の溶融金属の最大液面とほぼ同じ位置まで延びている。そして、電極69間の導通状態をモニタすることで容器100内の溶融金属の最大液面を検出することが可能であり、これにより容器100への溶融金属の過剰供給をより確実に防止できるようになっている。

【0060】本体50の底部裏面には、例えばフォークリフトのフォーク（図示を省略）が挿入される断面口形状で所定の長さの脚部（チャンネル）71が例えば平行するように2本配置されている。また、本体50内側の底部は、流路57側が低くなるように全体が傾斜している。これにより、加圧により流路57及び配管56を介して外部に溶融アルミニウムを導出する際に、いわゆる湯の残りが少なくなる。また、例えばメンテナンス時に容器100を傾けて流路57及び配管56を介して外部に溶融アルミニウムを導出する際に、容器100を傾ける角度をより小さくでき、安全性や作業性が優れたもの

となる。

【0061】このように本実施形態に係る容器100では、ハッチ62に内圧調整用の貫通孔65を設け、その貫通孔65に内圧調整用の配管66を接続しているのので、容器100内に溶融金属を供給する度に内圧調整用の貫通孔65に対する金属の付着を確認することができる。従って、内圧調整に用いるための配管66や貫通孔65の詰りを未然に防止することができる。

【0062】また、本実施形態に係る容器100では、ハッチ62に内圧調整用の貫通孔65が設けられ、しかもそのハッチ62が溶融アルミニウムの液面の変化や液滴が飛び散る度合いが比較的に小さい位置に対応する容器100の上面部のほぼ中央に設けられているので、溶融アルミニウムが内圧調整に用いるための配管66や貫通孔65に付着することが少なくなる。従って、内圧調整に用いるための配管66や貫通孔65の詰りを防止することができる。

【0063】更に、本実施形態に係る容器100では、ハッチ62が大蓋52の上面部に設けられているので、ハッチ62の裏面と液面との距離が大蓋52の裏面と液面との距離に比べて大蓋52の厚み分だけ長くなる。従って、貫通孔65が設けられたハッチ62の裏面にアルミニウムが付着する可能性が低くなり、内圧調整に用いるための配管66や貫通孔65の詰りを防止することができる。

【0064】次に、第2の工場20における第2の炉21から容器100への供給システムを図5に基づき説明する。

【0065】図5に示すように、第2の炉21内には溶融アルミニウムが貯留されている。この第2の炉21には供給部21aが設けられ、この供給部21aには吸引管201が挿入されている。この吸引管201は、供給部21aの溶融されたアルミニウムの液面から一端（吸引管201の他方の先端部201b）が出没するように配置されている。すなわち、吸引管201の一方の先端部201aは第2の炉21の底部付近まで延在し、吸引管201の他方の先端部201bは供給部21aから外側に導出されている。吸引管201は、保持機構202により基本的には傾斜して保持されている。その傾斜角は例えば垂線に対して10°程度傾いており、上記容器100における配管56の先端部の傾斜と合致するようになっている。この吸引管201の先端部201bは容器100における配管56の先端部に接続されるものであり、このように傾斜を合致させることによって吸引管201の先端部201bと容器100における配管56の先端部との接続が容易となる。

【0066】そして、配管66に減圧用のポンプ313に接続された配管67を接続する。次に、ポンプ313を作動させて容器100内を減圧する。これにより、第2の炉21内に貯留されている溶融アルミニウムが吸引



管201及び配管56を介して容器100内に導入される。

【0067】本実施形態では、特に、このように第2の炉21内に貯留されている熔融アルミニウムを吸引管201及び配管56を介して容器100内に導入するようにしているので、熔融アルミニウムが外部の空気と接触することはない。従って、酸化物が生じることがなく、本システムを用いて供給される熔融アルミニウムは非常に品質が良いものとなる。また、容器100内から酸化物を除去するための作業は不要となり、作業性も向上する。

【0068】本実施形態では、特に、容器100に対する熔融アルミニウムの導入と容器100からの熔融アルミニウムの導出を実質的に2本の配管56、312だけを使って行うことができるので、システム構成を非常にシンプルなものとするができる。また、熔融アルミニウムが外気に接触する機会が激減するので、酸化物の生成をほぼなくすることができる。

【0069】図6は以上のシステムを自動車工場に適用した場合の製造フローを示したものである。

【0070】まず、図5に示したように、第2の炉21内に貯留されている熔融アルミニウムを吸引管201及び配管56を介して容器100内に導入（受湯）する（ステップ501）。

【0071】次に、図1に示したように、容器100を公道30を介してトラック32により第2の工場20から第1の工場10に搬送する（ステップ502）。

【0072】次に、第1の工場（ユースポイント）10では、容器100が配送車18により自動車エンジン製造用のダイキャストマシーン11まで配送され、容器100から保持炉12に熔融アルミニウムが供給される（ステップ503）。

【0073】次に、このダイキャストマシーン11において、保持炉12に貯留された熔融アルミニウムを用いた自動車エンジンの成型が行われる（ステップ504）。

【0074】そして、このように成型された自動車エンジン及び他の部品を使って自動車の組み立てが行われ、自動車が完成する（ステップ505）。

【0075】本実施形態では、上述したように自動車のエンジンが酸化物を殆ど含まないアルミニウム製であるので、性能及び耐久性のよいエンジンを有する自動車を製造することが可能である。

【0076】本発明の更に別の実施形態を説明する。

【0077】図7は本発明の第2の実施形態に係る容器の断面図である。同図では傾斜させた状態が示されている。

【0078】同図に示す容器2100は、容器本体2110と、容器本体2110の中心2111からずれた位置2112から容器本体2110外に配設された配管2

130とを具備する。

【0079】容器本体2110はその上部に開口2113を有し、その開口2113を塞ぐように蓋2114が装着されている。

【0080】容器本体2110は、第1の空間2115を構成する例えばSS400（JIS）などの鋼からなる第1のフレーム2116と、第1のフレーム2116との間に第2の空間117を構成するように配設された例えばSS400（JIS）などの鋼からなる第2のフレーム2118とを有する。これらフレーム材料は線膨張率の小さな材料から構成することが好ましく、また内層に施工するキャストなどの断熱材料との線膨張率の差が小さな材料を採用することが好ましい。さらに第1のフレームと第2のフレームとはその物性を協調させることが好ましくここでは同一物性を有する材料を選択して採用している。

【0081】容器本体2110の底部には、フォークリフトのフォークが挿入される1対の口の字状の係止部材2119、2119が取り付けられている。

【0082】蓋2114には、そのほぼ中心寄りに容器本体2110内に例えばアルミニウム等の金属の溶湯2120を注入するための開口2121が設けられ、その開口2121には子蓋2122が収着されて図示を省略した固定具により開口2121に子蓋2122が固定されるようになっている。

【0083】また、蓋2114には、図示を省略した加圧ポンプから加圧用の気体を容器本体2110内の第1の空間2115に導入するための導入口2123が設けられている。上記気体として窒素ガス等の不活性ガスを用いることで溶湯2120の酸化を防止することができる。

【0084】更に、蓋2114には、容器本体2110の中心2111からずれた位置2112から容器本体2110外に配設された配管2130が取り付けられている。配管2130の下端2131は容器本体2110内の底部付近まで位置している。この下端2131を開閉自在とする機構を設けても構わない。これにより、容器が倒れたときに湯が流出することを防止することが可能となる。配管2130は、容器本体2110外において、例えば上方に向けて5°～10°程度傾斜する傾斜部2132と、下方に向けて開口する吐出部2133とを有する。

【0085】ここで、容器本体2110の中心2111と上記ずれた位置2112との間隔は、例えば内径800mmの容器の場合で300mm程度である。この変位はもっと大きくても小さくても同様の効果を得ることができる。

【0086】このような容器2100では、まず水平状態で、導入口2123から加圧気体を導入し、容器本体2110内の溶湯2120を配管2130から外部に圧

送する。その後、図7に示すようにフォークリフトで配管2130側に傾斜させて、残りの溶湯2120を配管2130から外部に圧送する。

【0087】このように構成された本実施形態の容器2100では、配管2130が容器本体2110の中心からずれているので、傾けたときに容器本体2110内の液面に対する変位が大きくなり、この状態で溶湯を吐き出した後水平に戻すと配管2130の下端2131と溶湯2120面との間に空間ができ、配管詰まりが防止される。

【0088】図8は本発明の第3の実施形態に係る容器の断面図である。以下の実施形態で既に図示した構成要素と同一の構成要素には同一の符号を付して説明を省略する。

【0089】この容器2200では、第1の空間2115と第2の空間2117とを接続する少なくとも1つの通路（配管）2210が設けられている。

【0090】第2の空間2117には、加圧機構2220及びリークバルブ2230が取り付けられている。

【0091】加圧機構2220では、加圧バルブ2221及び減圧弁を2222を介してエアータンク2223から第2の空間2117に加圧エアが導入されるようになっている。また加圧機構2220には圧力コントローラ2224が取り付けられている。

【0092】なお、加圧機構2220に代えて真空ポンプを接続することも可能である。

【0093】このように構成された容器2200では、第2の空間2117を真空に引いておけば保温になり、断熱材の経時変化による断熱性能の低下を補償することができる。例えば経時変化に応じて真空度を高めるようにすればよい。

【0094】また、このように構成された容器2200では、通路2210を介して第2の空間2116間側から第1の空間2115を加圧すると、圧送気体は予熱されてから容器内部（第1の空間2115）に供給される。従って、溶湯の温度低下を小さく抑えることができる。特に、圧送最終段階においては溶湯と気体の間欠吐出が発生しやすく、その場合に溶湯の温度が圧送気体に奪われて粘性が大きくなる。従って、圧送気体を予熱することと、溶湯の温度低下を抑制し、配管詰まりを効果的に防止することができる。加えて、安全な給湯停止もでき、給湯停止に要する時間を短くすることができる。

【0095】更に、このように構成された容器2200では、リークバルブ2230により第1の空間2115のリークを通路2210を介して第2の空間2117側から行うようにすることで、高温気体をある程度冷やしてからリークバルブ2230からリークしている。よって、リークバルブ2230にかかる熱的負荷を軽減し、装置の信頼性向上、長寿命化を図ることができる。

【0096】図9は本発明の第4の実施形態に係る容器

の断面図である。

【0097】同図に示す容器2300では、第1の空間2115に加圧機構2220が接続され、第2の空間2117に減圧機構2310が接続されている。減圧機構2310では、例えば真空バルブ2311を介して真空ポンプ2312が第2の空間2117に接続され、それらの間に真空計2313やリークバルブ2314が介挿されている。

【0098】また、第1の空間2115と第2の空間2117とを接続する通路2210には、第2のバルブとしてのリークバルブ2320が介挿され、更に容器本体内には第1のバルブとしてのリークバルブ2321が接続されている。

【0099】このような構成の容器2300では、給湯停止動作に要する時間短縮、もしくは停止動作の信頼性の向上を図ることができる。すなわち、第2の空間2117は減圧しておき、給湯停止時には、まず第1のバルブとしてのリークバルブ2321を開放して第1の空間2115内を復圧する。ついで第2のバルブとしてのリークバルブ2320を開放し第1の空間2115を負圧にする。これにより完全な給湯停止、更には配管内の溶湯の容器側への引き戻しができる。

【0100】図10は本発明の第5の実施形態に係る容器の断面図である。

【0101】同図に示す容器2400では、上方に向かう傾斜を有する配管2420が容器本体2410底部付近に接続されている。配管2420の他端は少なくとも容器2400より高い位置まで延びている。

【0102】図11は本発明の第6の実施形態に係る容器の断面図である。

【0103】同図に示す容器2500では、容器本体2510内を下部付近で通過しつつ2分する隔壁2520と、隔壁2520で区切られた一方の空間2530側に接続された樋部2540とを具備する。他方の空間2531には、加圧機構2220が接続されている。樋部2540の上部には蓋2541が設けられている。

【0104】本実施形態の容器2500では、加圧機構2220により容器内を加圧すると、樋部2540を介して容器内の湯が外部に吐出される。

【0105】すなわち、配管が本体内部にあると、メンテが大変

詰まりやすい

メンテ時に配管傷つきやすい

という問題ある。

【0106】これに対して本実施形態の容器2500では、隔壁2520で分離された一方の空間2530を配管の代わりに使用し、例えば開口部2532からオーバーフローさせて樋部2540で給湯するものである。これによりメンテナンスが非常に簡単になり、しかも詰まりにくく、更には詰まっても通常メンテナンスで回復さ

【０１０７】図１２は本発明の第７の実施形態に係る音  
 器の断面図である。

【０１０８】同図に示す容器２６００は、図１１に示した容器における桶部２５４０の上部に配置された蓋２５４１を取り除いたものである。

[0109]

【発明の効果】以上説明したように、本発明によれば、内圧調整に用いるための配管や孔の詰りを防止することができる。

【図面の簡単な説明】

【図 1】本発明の一実施形態に係る金属供給システムの構成を示す概略図である。

【図 2】本発明の一実施形態に係る容器と保持炉との関係を示す図である。

【図 3】本発明の一実施形態に係る容器の断面図である。

【図4】 図3の平面図である.

【図5】本発明の一実施形態に係る第2の工場における

第2の炉から容器への供給システムの構成を示す図である。

【図6】本発明のシステムを使った自動車の製造方法を示すフロー図である。

【図 7】第 2 の実施形態に係る容器の断面図である。

【図8】第3の実施形態に係る容器の断面図である。

【図9】第4の実施形態に係る容器の断面図である。

【図 10】第 5 の実施形態に係る容器の断面図である。

【図 11】第 6 の実施形態に係る容器の断面図である。

【図 12】第 7 の実施形態に係る容器の断面図である。

【符号の説明】

50 容器本体

51、60 開口部

57 流路

62 ハッチ

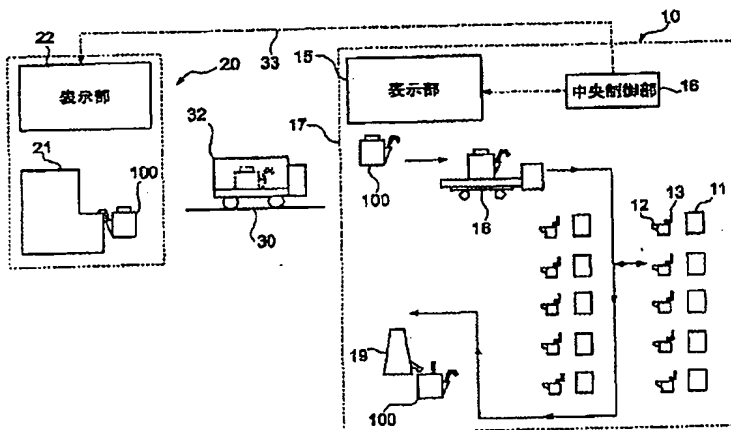
## 65 内圧調整用の貫通孔

## 66 内圧調整用の配管

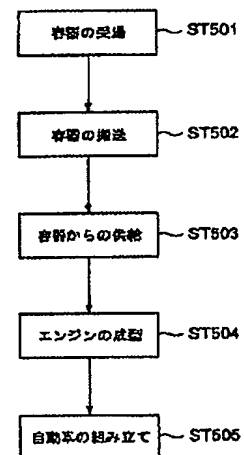
60 開口

100 熔融金属供给用容器

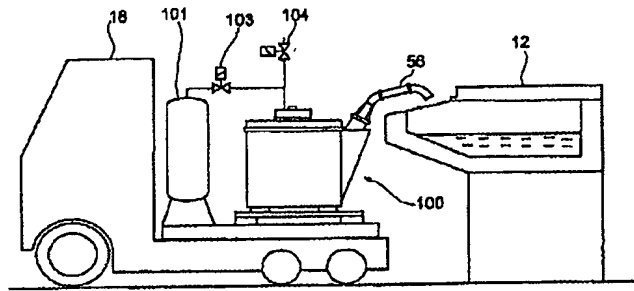
【例 1】



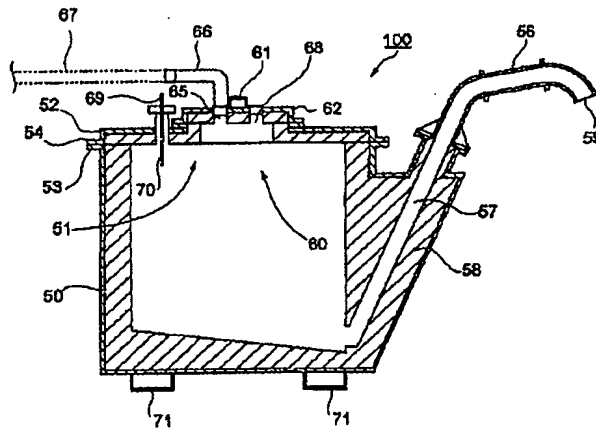
(☒ 6)



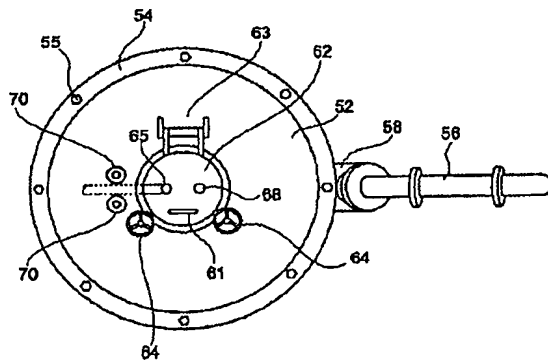
【図 2】



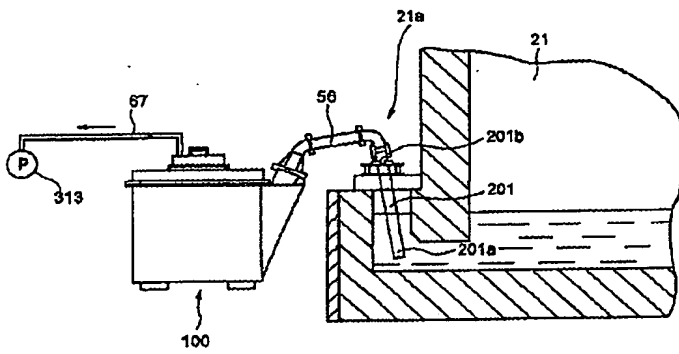
【図 3】



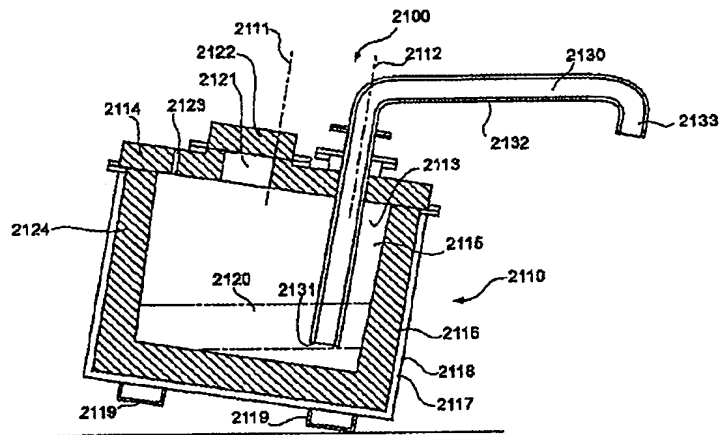
【図 4】



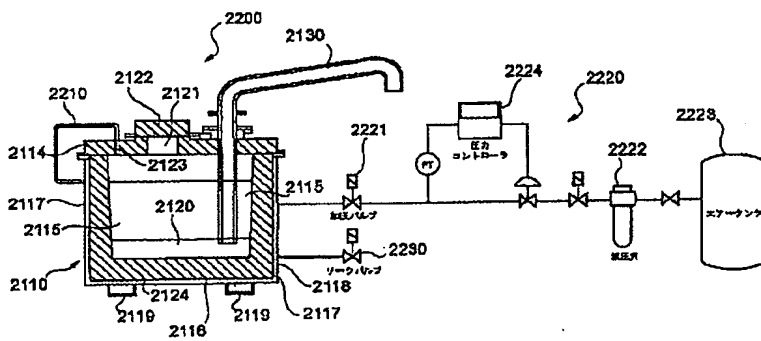
【図5】



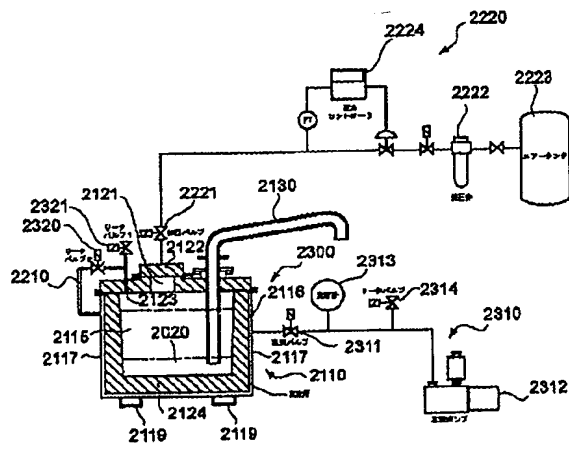
【図7】



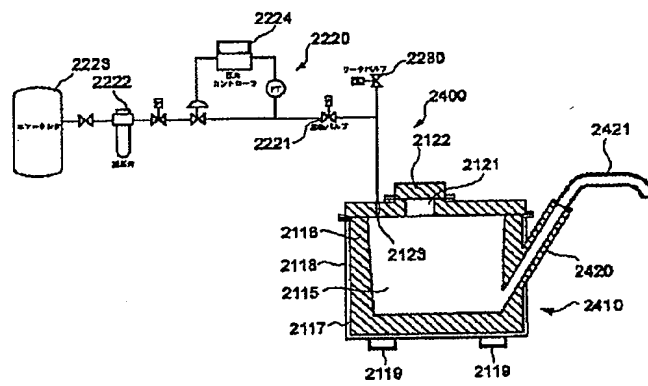
【図8】



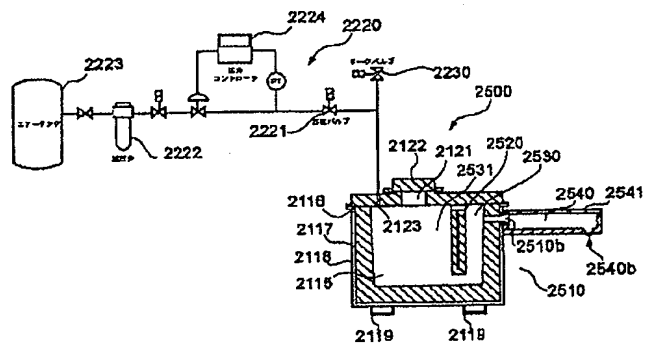
【図 9】



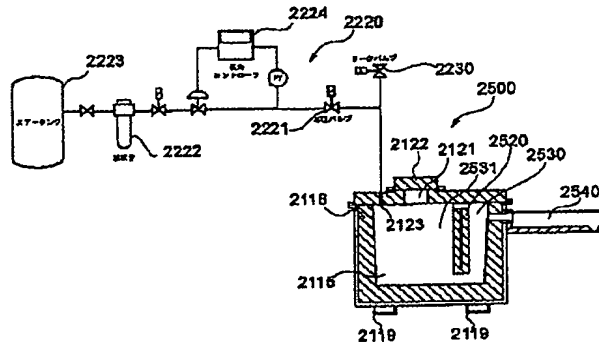
【図 10】



【図 11】



【図 12】



【手続補正書】

【提出日】平成13年12月5日（2001. 12.

5）

【手続補正1】

【補正対象書類名】明細書

【補正対象項目名】特許請求の範囲

【補正方法】変更

【補正内容】

【特許請求の範囲】

【請求項1】 溶融金属を収容することができる容器

と、

前記容器の上面部に開閉可能に設けられ、前記容器の内外を連通する内圧調整用の貫通孔が設けられたハッチ

と、

前記容器の上面部で、かつ、該上面部の中心から前記貫通孔までの距離よりも離れた位置に設けられ、前記容器の内外を連通し、前記溶融金属を流通することが可能な流路とを具備することを特徴とする溶融金属供給用容器。

【請求項2】 溶融金属を収容することができる容器

と、

前記容器の上面部に開閉可能に設けられ、前記容器の内外を連通する内圧調整用の貫通孔が設けられたハッチ

と、

前記容器の側面に設けられ、前記容器の内外を連通し、前記溶融金属を流通することが可能な流路とを具備することを特徴とする溶融金属供給用容器。

【請求項3】 請求項1又は請求項2に記載の溶融金属供給用容器において、

前記ハッチは、前記容器の上面部のほぼ中央に設けられていることを特徴とする溶融金属供給用容器。

【請求項4】 請求項1から請求項3のうちいずれか1項に記載の溶融金属供給用容器において、

前記貫通孔に取り付けられ、前記容器の上面部から上方に向けて突出し、所定の高さの位置で水平方向に折り曲げられ、接続部が水平方向に導出された配管を更に具備することを特徴とする溶融金属供給用容器。

【請求項5】 請求項4に記載の溶融金属供給用容器において、

前記配管は、前記貫通孔に着脱可能に螺着されていることを特徴とする溶融金属供給用容器。

【請求項6】 溶融金属を収容することができ、内外を連通し、上面部のほぼ中心の位置に設けられた内圧調整用の貫通孔を有する容器と、

前記容器の上面部で、かつ、該上面部の中心から前記貫通孔までの距離よりも離れた位置に設けられ、前記容器の内外を連通し、前記溶融金属を流通することが可能な流路とを具備したことを特徴とする溶融金属供給用容器。

【請求項7】 溶融金属を収容することができ、内外を連通し、上面部のほぼ中心の位置に設けられた内圧調整用の貫通孔を有する容器と、

前記容器の側面に設けられ、前記容器の内外を連通し、前記溶融金属を流通することが可能な流路とを具備したことを特徴とする溶融金属供給用容器。

【請求項8】 請求項6又は請求項7に記載の溶融金属供給用容器において、

前記容器は、当該容器の上面部のほぼ中心部に設けられたハッチを更に具備し、

前記貫通孔は、前記ハッチに設けられていることを特徴とする溶融金属供給用容器。

【請求項9】 請求項6から請求項8のうちいずれか1項に記載の溶融金属供給用容器において、

前記貫通孔に取り付けられ、前記容器の上面部から上方に向けて突出し、所定の高さの位置で水平方向に折り曲げ

られ、接続部が水平方向に導出された配管を更に具備することを特徴とする熔融金属供給用容器。

【請求項10】 請求項9に記載の熔融金属供給用容器において、

前記配管は、前記容器に着脱可能に螺着されていることを特徴とする熔融金属供給用容器。

【請求項11】 熔融金属を収容することができ、上部に第1の開口部を有する容器と、

前記容器の内外を連通し、前記熔融金属を流通することが可能な流路と、

前記容器の第1の開口部を覆うように配置され、ほぼ中央に前記第1の開口部よりも小径の第2の開口部を有する蓋と、

前記蓋の上面部に開閉可能に設けられ、前記容器の内外を連通する内圧調整用の貫通孔が設けられたハッチとを具備することを特徴とする熔融金属供給用容器。

【請求項12】 請求項11に記載の熔融金属供給用容器において、

前記貫通孔に取り付けられ、前記容器の上面部から上方に向けて突出し、所定の高さの位置で水平方向に折り曲げられ、接続部が水平方向に導出された配管を更に具備することを特徴とする熔融金属供給用容器。

【請求項13】 請求項12に記載の熔融金属供給用容器において、

前記配管は、前記貫通孔に着脱可能に螺着されていることを特徴とする熔融金属供給用容器。

【手続補正書】

【提出日】平成14年3月4日（2002. 3. 4）

【手続補正1】

【補正対象書類名】明細書

【補正対象項目名】特許請求の範囲

【補正方法】変更

【補正内容】

【特許請求の範囲】

【請求項1】 熔融金属を収容することができ、上部に第1の開口部を有する容器と、

前記容器の内外を連通し、前記熔融金属を流通することが可能な流路と、

前記容器の第1の開口部を覆うように配置され、ほぼ中央に前記第1の開口部よりも小径の第2の開口部を有する蓋と、

前記蓋の上面部に開閉可能に設けられ、前記容器の内外を連通する内圧調整用の貫通孔が設けられたハッチとを具備することを特徴とする熔融金属供給用容器。

【請求項2】 請求項1に記載の熔融金属供給用容器において、

前記貫通孔に取り付けられ、前記容器の上面部から上方に向けて突出し、所定の高さの位置で水平方向に折り曲げられ、接続部が水平方向に導出された配管を更に具備することを特徴とする熔融金属供給用容器。

【請求項3】 請求項2に記載の熔融金属供給用容器において、

前記配管は、前記貫通孔に着脱可能に螺着されていることを特徴とする熔融金属供給用容器。